Marine Review

The National Publication Covering the Business of Transportation by Water

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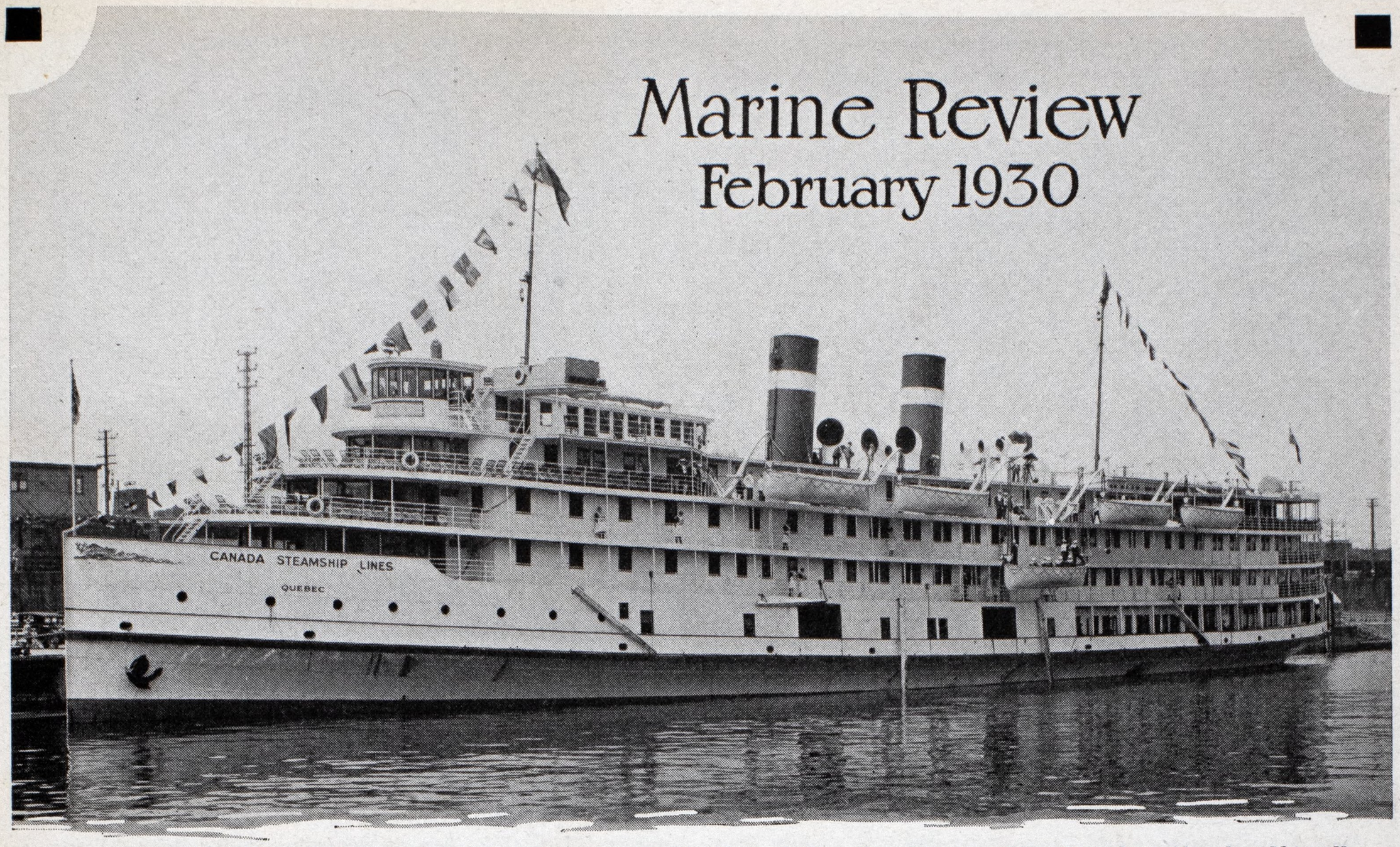
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Marine Review
February 1930



Steamer Quebec, Canada Steamship Lines, Demonstrating Lifeboat Drill. Two Minutes After Signal to Abandon Ship all Boats Were Swung Out; One Had Been Lowered and Was Being Pulled Away from Ship's Side

Should Mail Contracts Be Awarded All Owners of Board Lines?

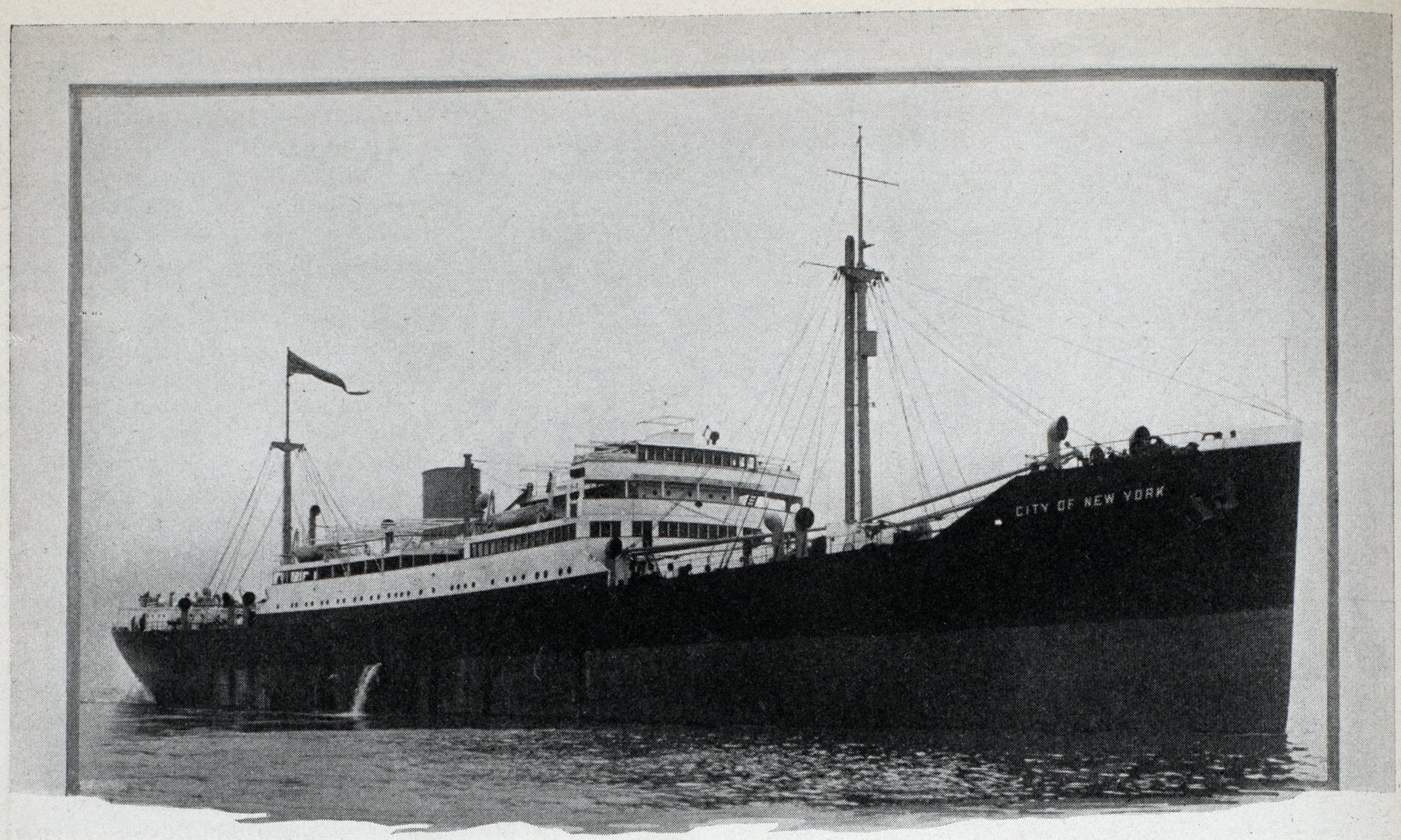
Editorial

IN ORDER to carry out the intent of the Jones-White law in giving encouragement and aid to private operators who have bought shipping board lines and who are now operating these lines in overseas services, and as a definite incentive to others in taking over in due course the remaining government lines, a bill was recently introduced in the house of representatives by Wallace H. White, of Maine, amending the present law so as to specifically favor such operators in the future award of mail contracts. This is plain justice and the bill should be enacted into law promptly. It is so clearly a matter of fairness that it would seem necessary merely to call attention to the situation for unanimous acceptance.

It is of first concern to the administration in the interest of the nation, that every step taken in transferring government services to private operation should tend to establish a sound and thriving merchant marine. Unless the shipping board is inefficient, unfit, careless or biased in the manner in which it strives to perform its duties under the law we can only assume that it has sold each government line to operators who are thoroughly qualified, reliable and skillful in the business of operating ships.

On this premise one operator of acquired board lines is on exactly the same footing as another. Each has to meet similar foreign competition and each is subject to the same scale of operating expense. If one is to receive the benefits of a liberal mail contract all are equally entitled to the same support unless in specific cases, before purchase, it is clearly understood that no such aid will be available.

Success of each line sold is of paramount interest to the country. On the assumption of efficient and honest management those who had the courage and initiative to buy and now operate former government owned lines in overseas trade should have first consideration in the award of mail contracts. We believe congress should adopt Representative Wallace's amendment and that such action will further strengthen and stimulate private operation of American ships.



Twin Screw Passenger and Cargo Motorship City of New York, Completed Jan. 17 by Sun Shipbuilding & Dry Dock Co. for American South African Line, Inc.—Enters Service Feb. 1, New York to South and East Africa

New Diesel Ship City of New York Enters South African Service

By E. C. Kreutzberg

THE distinction of being the first large combination passenger and freight vessel equipped with diesel engines to be built in the United States belongs to the CITY OF NEW YORK, completed on Jan. 17, at the Sun Shipbuilding & Dry Dock Co., Chester, Pa. for the American South African Line, Inc. This vessel is also the first to be placed under contract in accordance with the provisions of the Jones-White act, and the first to be completed and delivered to its owner. It is also said that she is the first privately built American merchant ship for overseas trade to be launched from an American yard since 1918. The CITY OF NEW YORK after being fitted out at the Sun yard at Chester, set out on her trial trip on the Delaware river Jan. 11, with a large group of observers on board. The vessel left the shipyard at 8:30 a.m. Her twin screw Sun-Doxford diesel engines operated with entire satisfaction and the guarantee of 13½ knots was met. During the trials the seaworthiness of the vessel in every respect was fully demonstrated as the new liner was put through every known maneuver. James A. Farrell, Jr., president of the American South African line, who was on board announced that plans already are completed for building another motor vessel and that additional tonnage to supplement the company's present fleet will be provided as trade develops between the United States and South Africa as now fully anticipated.

Maiden Trip Begins Feb. 1

The new vessel was delivered to the owner at New York on Jan. 20, and she is scheduled to sail Feb. 1 on her maiden trip to South and East Africa, with Capetown, Port Elizabeth, East London, Durban, Lourenco Marques and Beira as ports of call. General particulars of the vessel are tabulated on page 21 for convenience. Sea speed loaded will approximate 13½ knots. Length over all is 470 feet 8 inches, the breadth molded is 61 feet 6 inches and on a draft of 26 feet this vessel is designed to carry a total of 9400 deadweight tons. The mean draft in light condition is 11 feet 11 inches. Her cargo cubic capacity is 464,000 bale measurement. Her steaming radius at 13 knots is 28,500 nautical miles, which will save the expense of bunkering in a foreign port. Special attention has been given to all features which will enable the ship to load, transport and discharge miscellaneous cargo economically and safely. Double rigged hatches have been provided for handling the wide variety of merchandise exported to and imported from South Africa. Excellent accommodations are provided for 60 first class passengers. No other classes are carried.

In type the motorship CITY OF NEW YORK is of flush deck design with three decks, extended bridge and raised forecastle. The hull is built on the transverse system of framing. Stability received special consideration in the design and the metacentric height of the ship in loaded condition is about 4 feet 3 inches. The steel hull of the ship has been built to the highest classification in the American Bureau of Shipping and in accordance with the subdivision

requirements for passenger ships.

A feature of special interest is the very large bunker tank capacity amounting to 15,277 barrels of diesel oil in double bottoms and wing and center tanks. Complete electric equipment is used for both deck and engine room auxiliaries. All passenger rooms are located outside on the three upper passenger decks with broad passage ways and are so ventilated as to give maximum comfort in tropical climates. Many of the rooms have adjoining baths. The three public rooms comprise an ample and well appointed lounge, smoking and dining room. The forward bridge deck space is enclosed both front and sides with efficient sliding windows of the Kearfott type. Plans for the vessel were prepared under the supervision of James A. Farrell Jr., and John J. Farrell, Arthur R. Lewis and Leigh C. Palmer, directors of the owning company.

M. S. City of New York

Owner—American South African Line, Inc.	
Builder—Sun Shipbuilding & Dry Dock Co.	
Launched	Oct. 19, 1929
Completed	Jan. 17, 1930
Length, overall, feet, inches	470–8
Length, B. P. P., feet, inches	450–0
Beam, molded, feet, inches	51–6
Depth, molded, feet, inches	37–0
Draft, loaded, feet, inches	26–0
Draft, light, feet, inches	11–11
Gross Tonnage	8272.45
Net tonnage	5025
Passenger capacity	61
Capacity, bale, cubic feet	464,000
Deadweight tons (26-foot)	9,400
Speed, knots	14
Bunker fuel (barrels)	15,277
Steaming Radius @ 13 knots	28,500
Metacentric height, ft., in	4–3
Number of propellers	2
Main drive diesel engines	2
Brake horsepower, each engine	2,700

Details of Hull Construction

It will be interesting to note, more in detail, the construction of this modern American diesel vessel especially constructed for an important overseas trade route. In the amidships section the frames are spaced 36 inches apart, reduced to 27 inches between the three-fifth length and the collision bulkhead; and to 24 inches in way of the peaks. The rudder is of the semifloating, balanced, streamline type. The double bottoms, 46 inches deep, are used for either fuel oil or water ballast. Cooling water for the diesel engines is stored in this space in way of the engine room. Fuel oil tanks are also provided on the outboard side of each shaft tunnel in the after hold, a long well between the tunnels being available for cargo. One double bottom tank is fitted with heating coils for winter service. If used for ballast the tank capacity is 2149 tons of salt water.

There are seven bulkheads, both water and oil tight. The forepeak is used for fresh water, the after peak for fuel oil. Culinary tanks are located abreast of the engine room casing. Fresh water capacity in the engine space double bottoms and the peak tank is over 350 tons, while the drinking water in the 'tween deck tanks totals 160 tons. Refrigerator space, located on the main deck in way of engine casing has a capacity of 5300 cubic feet.

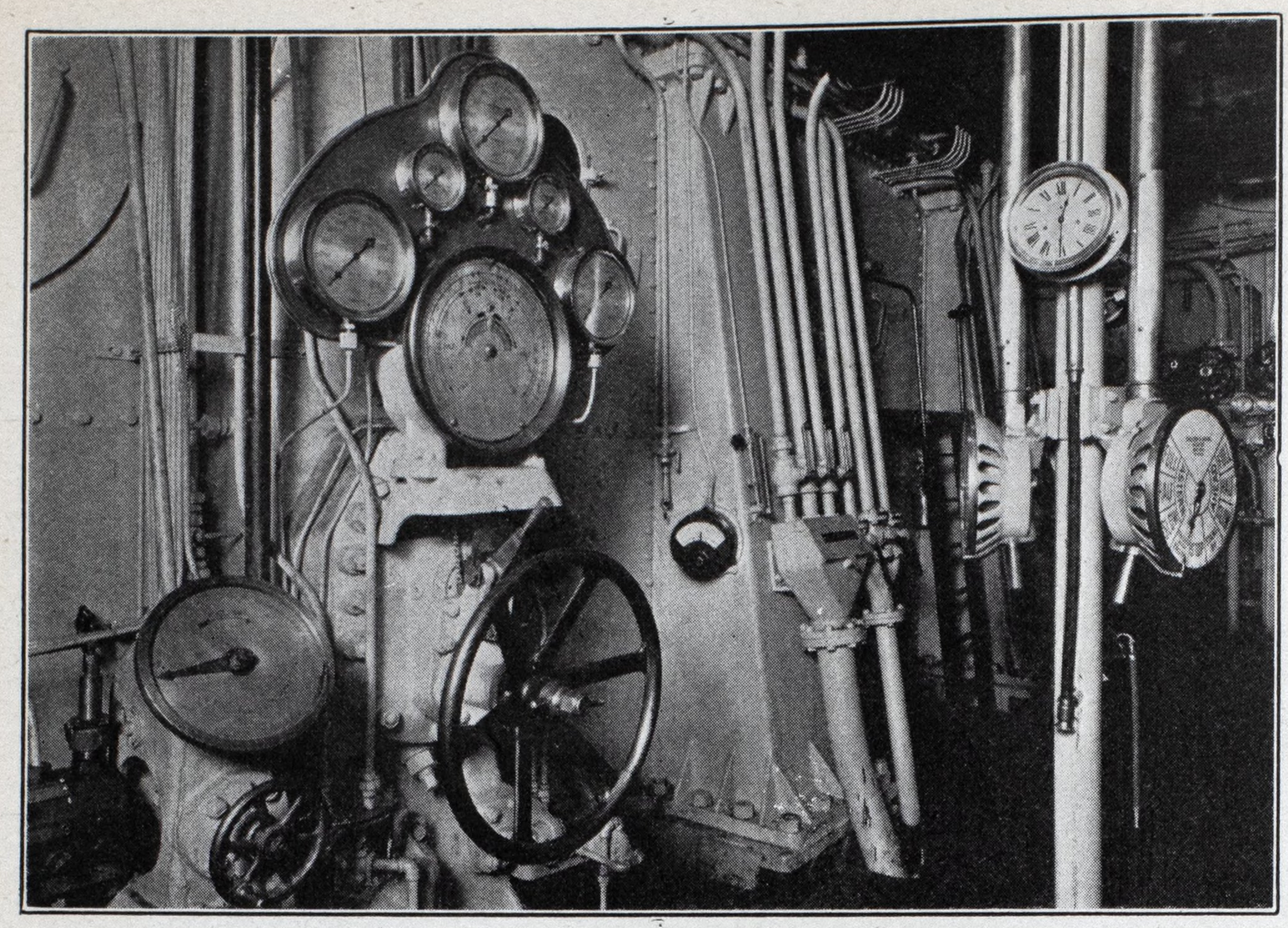
Cargo handling facilities arranged on the Burton system consists of two masts with four 7-ton booms on each and six kingposts, each with a 3-ton boom. Each of these 14 booms is of the steel tubular type. The kingposts are in three pairs, one at the forward end of the bridge deck, one at the after end, and one amidships, serving the smaller number three hatch to the bridge deck space. In addition, a 40-ton steel derrick is stepped to serve number two hatch. All these booms are served by 14 electric winches described elsewhere. Of the five hatches, numbers, one, two and four are each 36 feet by 18 feet; number five is 6 feet shorter, while number three measures 12 feet in length; all coamings being 24 inches. These large hatches, free from centerline ladders, insure excellent facilities for minimizing cargo damage.

Main Diesel Propelling Machinery

Propelling machinery consists of two 4-cylinder, Sun-Doxford, opposed piston, reversible oil engines, each 2700 shaft horsepower at 100 revolutions per minute, driving twin screws, capable of maintaining a sea speed of 13½ knots. Each cylinder is 23.62 inches diameter and 79.12 inches combined stroke working on the two-stroke cycle principle with the scavenge pump attached between cylinders number two and three. These engines are of the solid fuel injection type and are designed for a fuel con-



Dining Room—M. S. City of New York. Only First Class Passengers Are Carried



Engine Room M. S. City of New York Showing One of the Two 2700 Horsepower Sun-Doxford Opposed Piston Type Diesel Engines

sumption of 0.41 pound per shaft horsepower per hour for main propulsion. The specifications call for a consumption of 0.49 pound per shaft horsepower per hour for all purposes, with fuel of 19,170 B.t.u., viscosity 154 at 100 degrees gravity 23.2 degrees Baume, flash 235 degrees, fire 280 degrees, sulphur content 0.25. The engines operate at a mean indicated pressure of 90 pounds per square inch.

The cylinders are of cast iron reinforced about the combustion chamber by steel jackets with scavenger ports at the lower end and exhaust ports at the upper end. Easy access is had to the water jackets for cleaning. The scavenging air belt is bolted together by rectangular ducts to form one continuous passage fore and aft.

The steel forged crankshaft is of the built-up type with five sections, four 3-throw cranks, and six main bearings, the shaft being interchangeable; pins and journals having forced lubrication. The crank for the scavenge pump is between the two center main bearings. The scavenge pump is of large volume, the diameter being over four feet; the pressure of the scavenging air being only two or three pounds. The entire crankshaft was manufactured by The Midvale Co. In spite of the fact that there are thirteen cranks on the shaft, the action of the opposed pistons gives a uniform torque and a balance of piston effort, minimizing strains and stresses on any one crank.

Fresh water is used for cooling both the pistons and the cylinder jackets; the heat from the distilled water being absorbed through closed circuit and the temperature controlled in a tubular Griscom-Russell cooler through which sea water circulates. The cooler's capacity is 1000 gallons per minute from 160 degrees to 120 degrees using 80 degrees circulating water. The water is chemically treated to prevent rust or deposit on the jackets. Each piston has two walking tubes with link motion for the inlet and outlet service.



Attractive Club Smoking Room of the M. S. City of New York

Details of the Main Engines

The five front columns support the center crosshead guide, all guides being water cooled. Each of the two pistons is fitted with five rings and is water cooled, while each of the two fuel injection valves is also water cooled. Each cylinder has the usual nonreturn air starting valve and relief valve, the latter being set to blow off at 700 pounds.

For the air starting valves, the pusher rod, rollers and starting cams are operated by hand from the control station. The two steel camshafts are driven off the thrust shaft by gearing. The back camshaft is nonsliding, operating the ahead fuel injection cams and those for piston lubricating oil pumps and indicator drives. The front camshaft slides for maneuvering. There are two maneuvering shafts for operating the fuel injection valves parallel with the two camshafts. There is one maneuvering shaft for operating the air starting valve, to either end of which is keyed a lever operating the air starting valves through links and bell crank levers.

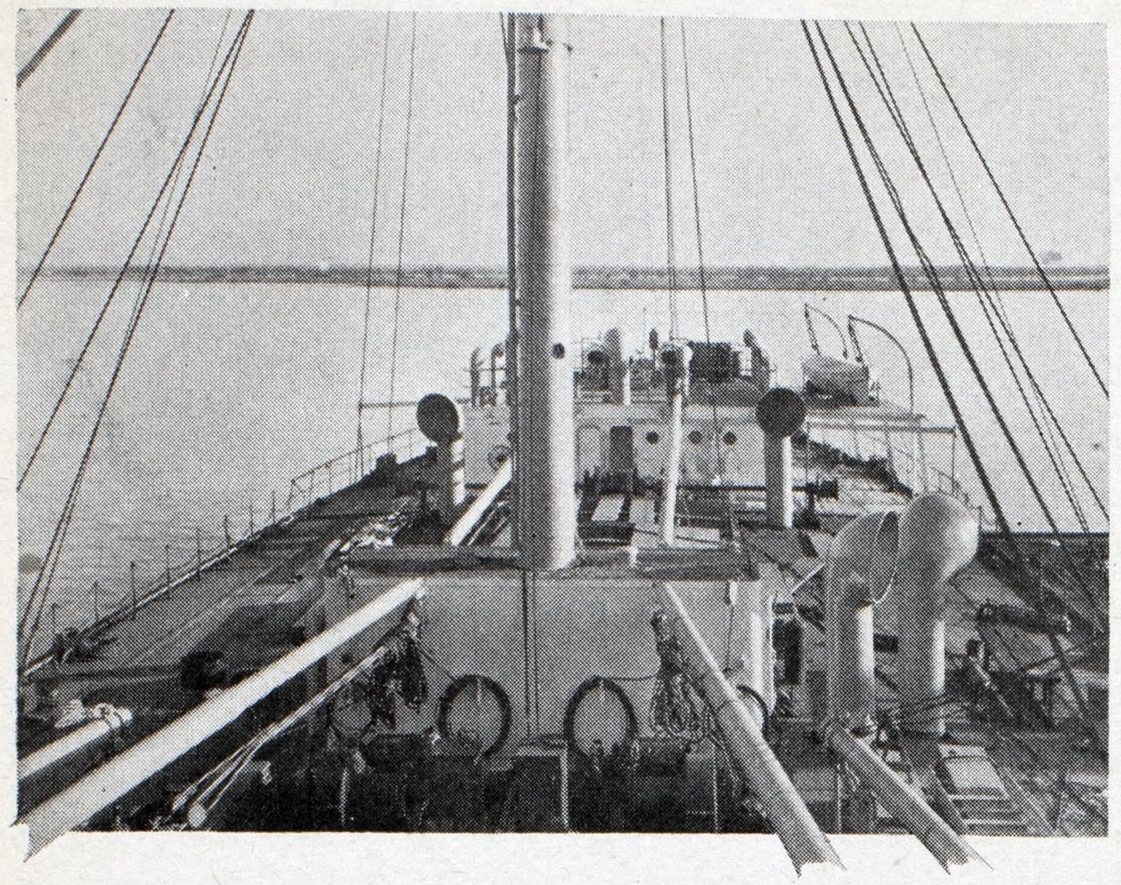
Maneuvering the engine, starting up on air, changing over to fuel injection and controlling the speed are regulated by a hand wheel. The sliding of the front camshaft for ahead or astern running is done by a hand lever; and all operations are so interlocked that only the correct sequence of maneuvering can result. In addition there is an indicator showing the direction in which the engine is running.

The usual type of engine speed governor for sea service is fitted to the suction valves on the fuel pump. The high pressure fuel oil pump is of the four-plunger type, driven from the thrust shaft and supplying the required quantity and pressure of fuel oil, this being regulated by hand. The high pressure oil pipes are solid drawn steel tubes supplied with oil filters.

The thrust shaft with single thrust collar is fitted with a Kingsbury thrust bearing. The turning gear is of the worm type, operated by a reversible electric motor.

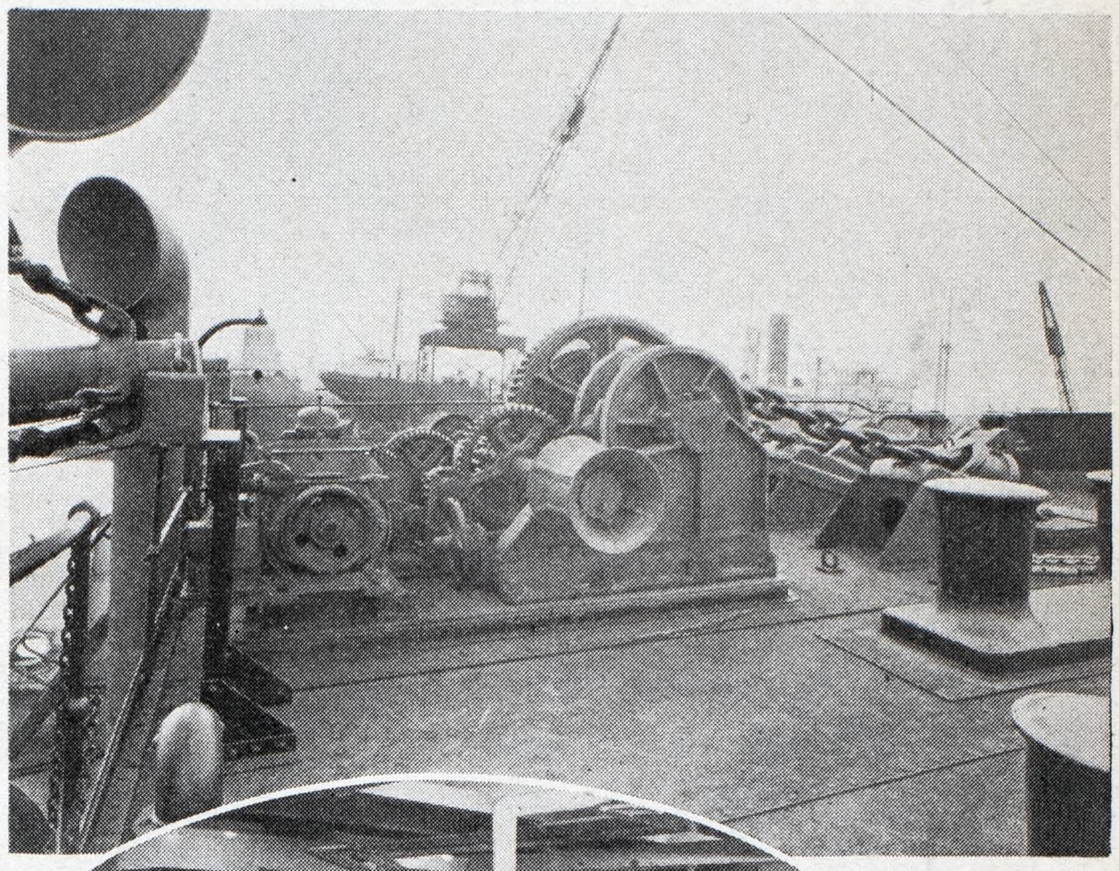
A continuous composition sleeve is

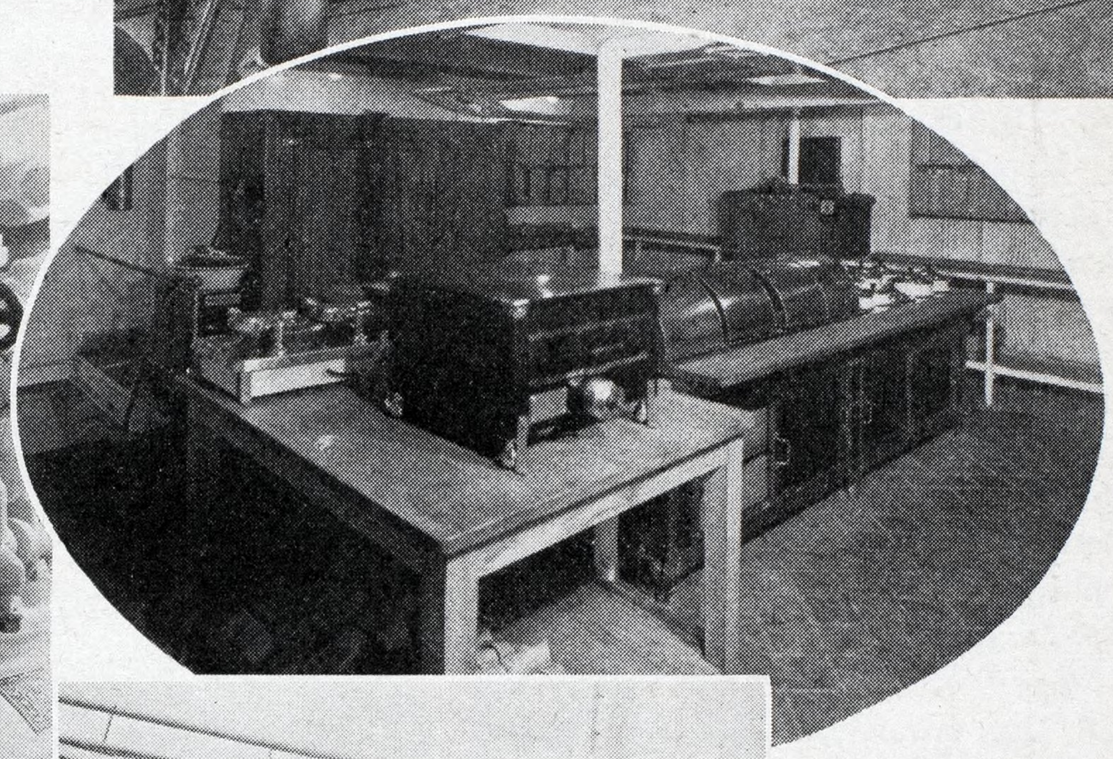
Views of Motorship City of New York

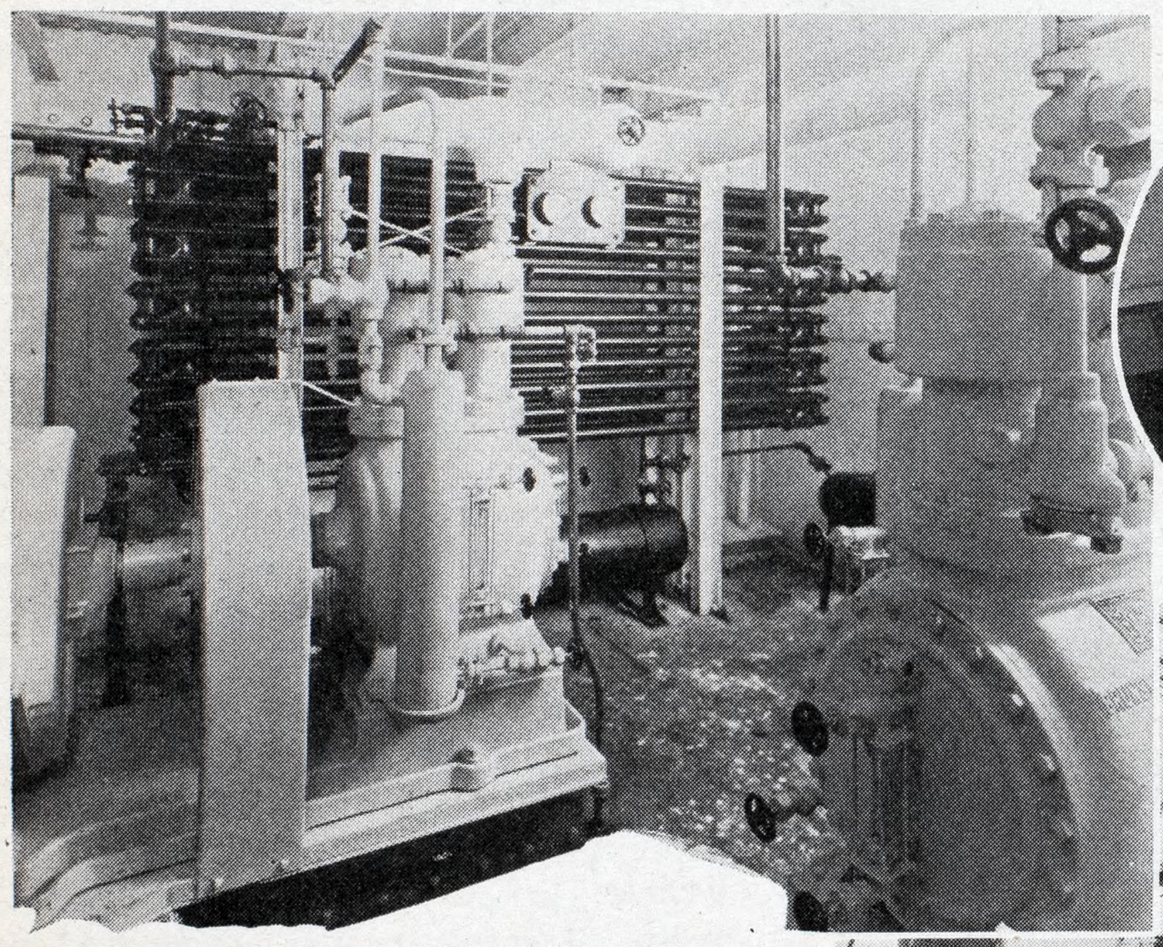


Above—Looking Aft on Deck, M. S. City of New York—Latest Cargo Handling Facilities—Electric Winches

Below—Electric Driven Anchor Windlass—Cast Steel Anchor Chain







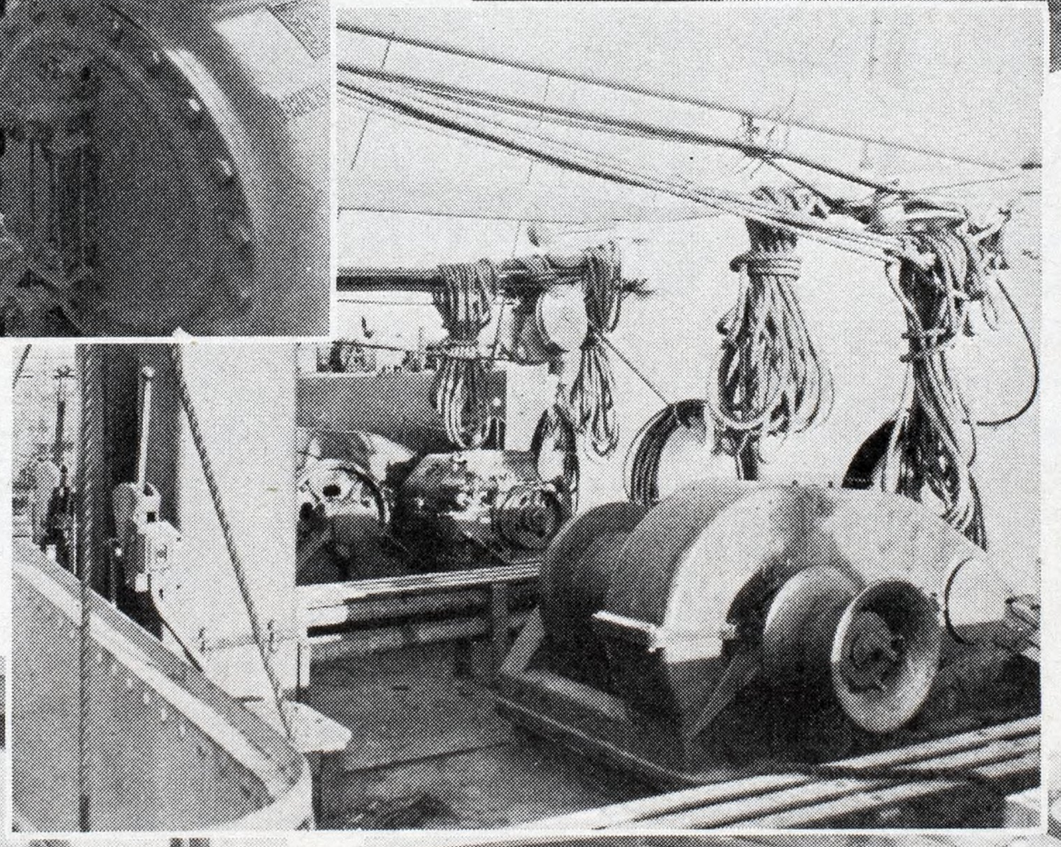
Above—Refrigerating Machinery—Two 6-ton, 6-cylinder Machines

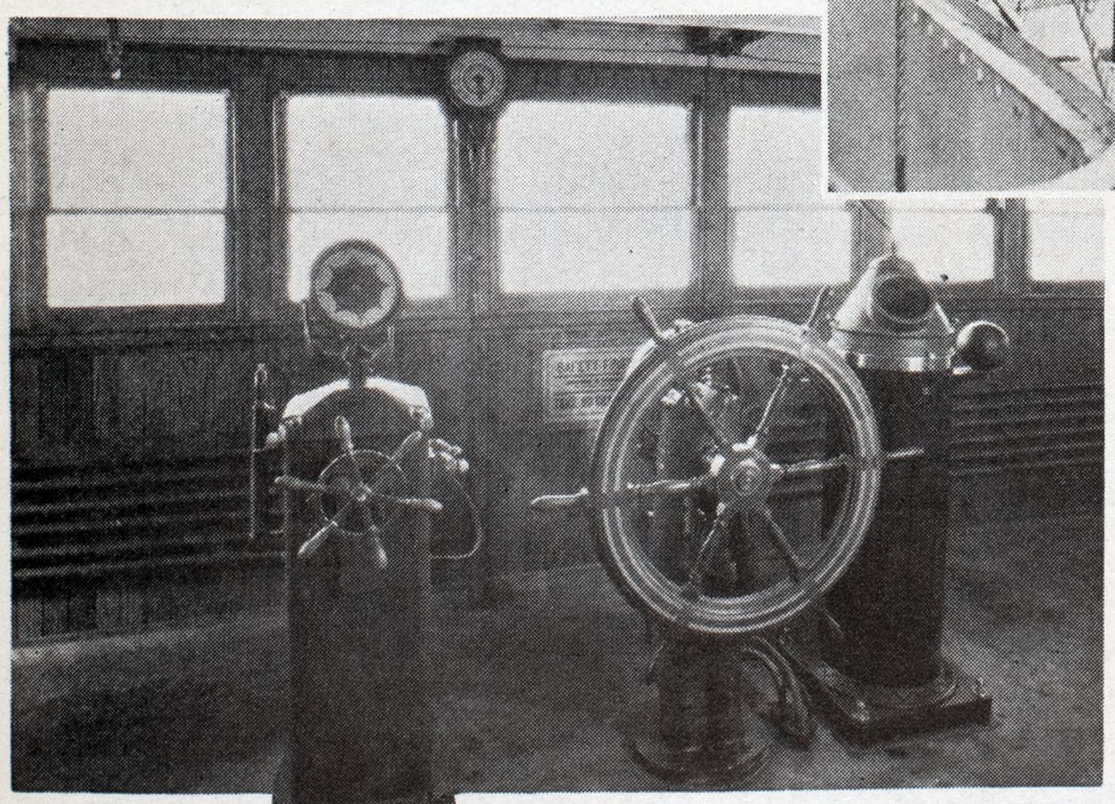
Above—All Electric Galley, Baking Oven, Broiler, Griddle and Dough Mixer

Left—Electric Winches

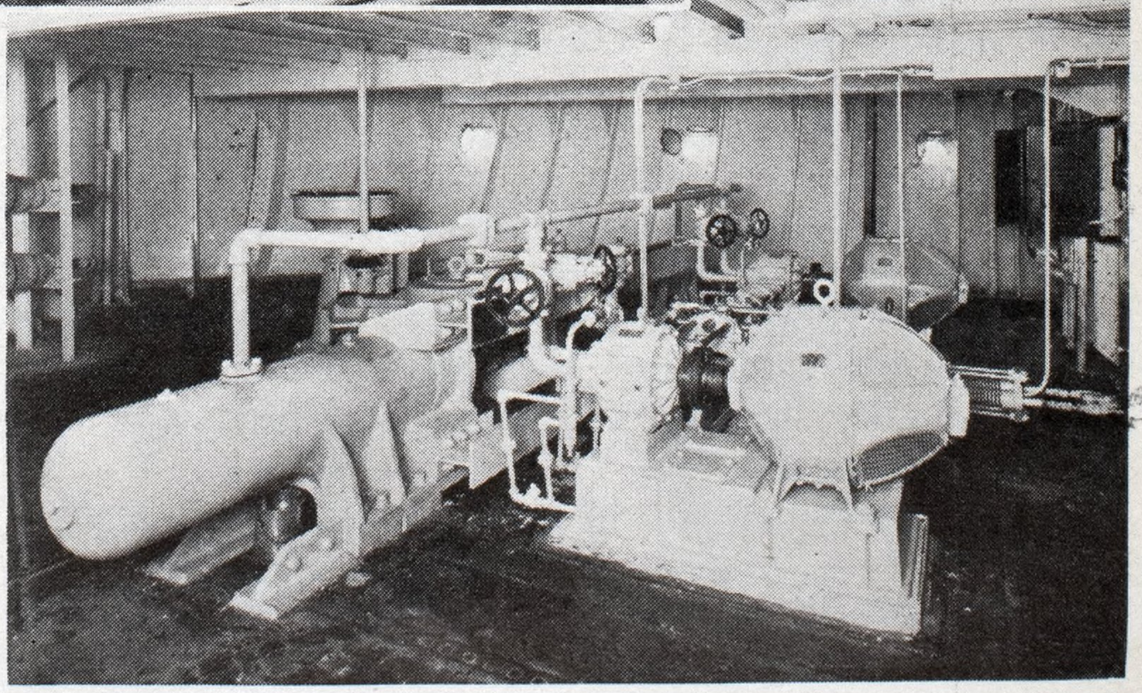
Below—Pilot House—Automatic Gyro Steerer—Gyro Compass

Below—Hydroelectric Steering Gear with Double Pumping Set









fitted to the tapered tailshaft for the entire length of the stern tube. The stern tube is fitted with the usual lignumvitae bearing. The propellers, built by the Sun company, are of the three-bladed solid bronze type, right hand starboard and left hand port. The propeller diameter is about 15 feet 9 inches with suitable surface and pitch.

Practically all the auxiliaries of the ship are electrically driven, power being furnished by three 220-kilowatt, 240-volt, direct current, main Westinghouse generators each connected to a 350-horsepower Ingersoll-Rand diesel engine. There is also one auxiliary 20-kilowatt generator driven by a 35-horsepower Standard diesel engine. The motors and controls for both deck and under deck machinery were furnished by Westinghouse.

In the electric motor-driven deck machinery are included the anchor windlass, warping winch, cargo winches, and steering gear. The windlass is of the spur gear type designed to lift both bower anchors weighing 10,045 pounds each, at a rate of 30 feet per minute in 30 fathoms of water. It is driven by a water-proof motor of 65 horsepower, equipped with a water-proof and magnetic control. The anchor chains are of 300 fathoms of 2½-inch stud link cast steel chain furnished by the National Malleable & Steel Castings Co.

The steering gear is of the hydro-electric type with a double pumping set driven by a 30-horsepower motor of the drip-proof, semienclosed, self-ventilated type.

There are 14 cargo winches, 12 of which are driven by 25 horsepower motors and two by 30 horsepower motors. The winches are equipped with snap action control and water-proof brakes. The full speed is about 28 feet per minute with a 1500-pound load, 185 feet with 4000-pound load and 100 feet with over 10,000 pounds. The warping winch is driven by a 30-horsepower water-proof motor, has a water-proof brake and is operated by a magnetic type control. This deck machinery was jointly provided by the American Engineering Co. and Westinghouse Electric & Mfg. Co.

Westinghouse water-proof deck motors are of the most rugged type built. The frame is of cast steel, split horizontally to facilitate the removal of the armature. The feet are cast integral with the lower half of the frame and are widely spaced and ribbed for strength and rigidity. Armatures are made small in diameter to reduce the moment of inertia. Bearings are of the sleeve type, babbitt lined. All details combine to produce motors noted for their reliability, ruggedness, heavy overload capacity, quick starting and stopping characteristics, and water tightness. All of these contribute to the low maintenance costs and effective service.

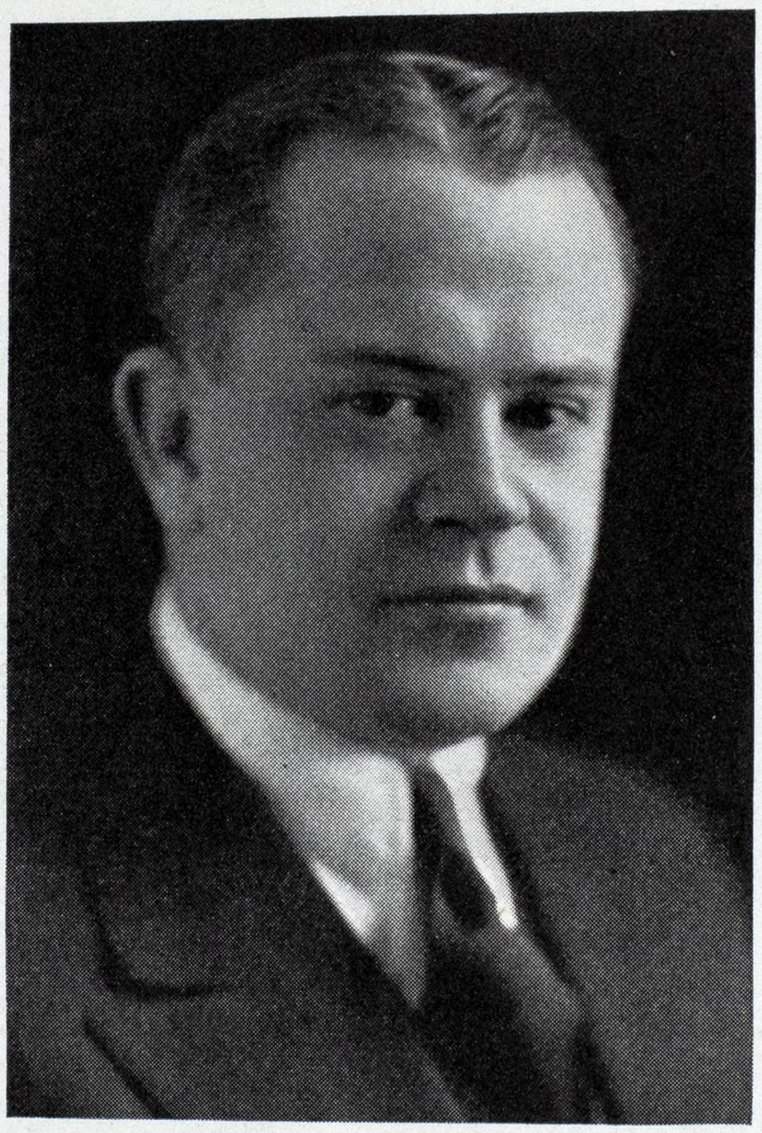
The only steam driven pumps are the two feed pumps for the exhaust

James A. Farrell Jr., President, American South African Line Inc.

JAMES A. FARRELL JR., president of the American South African Line Inc., is one of the youngest men in this country at the head of an important shipping interest. The son of James A. Farrell, president of the United States Steel Corp., he was born in Brooklyn, N. Y. in 1901, the day and date of his birth having been Friday, the thirteenth. He obtained his preliminary education at St. Ignatius Loyola grammar school, Brooklyn, and at the Canterbury school at New Milford, Conn. He then entered Yale university, graduating from Sheffield scientific school in 1924. Then he went on an inspection trip through all the European maritime countries and later that year became assistant to A. R. Lewis, president of the American-Cuban Steamship line.

In November, 1925, when only in his twenty-fifth year, Mr. Farrell organized the American South African Line Inc., becoming its president. The company acquired in competitive bidding, a fleet of shipping board vessels which was being operated out of New York to South and East African ports. This fleet comprised five freighters, each 8800 tons deadweight capacity and the company ever since has been operating a monthly service between New York and South and East Africa. In 1927 it secured its first mail contract from the United States government. Following the passage of the Jones-White act in 1928 it secured a new contract for mail carriage, at the same time agreeing to build two ships under the loan provision of the act.

Mr. Farrell, as head of this line, has established himself as a shipping man of unusual vision and ability. He believes that the future of the American merchant marine depends on continued favorable legislation, a policy of non-interference on the part of the government and on the withdrawal of the government from the shipping industry. Despite the fact that the line has seven foreign competitors in the trade between New York and the South and East African ports which it serves, it has been able to do better than hold its own. Mr. Farrell expects a continued increase in the business between the United States and South Africa. He comments on the fact, however, that the biggest increase in this trade is in the westerly direction; shipping from South Africa to the United States is growing much more rapidly than that in the reverse direction.



JAMES A. FARRELL Jr.

"South Africa is passing through a transitionary period," says Mr. Farrell. "Formerly its prosperity depended on the yield of wheat, gold and diamonds. At the present time its wealth is comprised chiefly in its production of base minerals, including copper, manganese, chrome ore, corundum and fluorspar. All of these products are brought by our line to the United States or to various European destinations.

"Our largest item of export to South Africa is the automobile. About 160,000 tons of American automobiles were shipped last year to South Africa. The new boats which we are adding to our fleet are equipped with facilities for most effectively handling the various materials which are offered as cargoes in this trade."

heat boilers; each being a simplex vertical, 4½ x 2¾ x 6 inches, while the auxiliary or emergency compressor is driven by a small gasoline motor to handle 10 cubic feet per minute of free air against a head of 250 pounds. All other auxiliaries are electrically driven. The two main engine fuel starting pumps are of the Watson-Stillman vertical 2-plunger type to work against 4000 pounds per square inch driven by 2 horsepower motors. The two Davis coolers for the main engine lubricating oil are able to cool 250 gallons per minute from 100 to 90 degrees with circulating water of 80 degrees. They use water from one of the circulating pumps, as does the jacket water cooler previously mentioned.



On Board M. S. City of New York During Trials Jan. 11. Left to Right—R. L. Burke, Vice President Sun Shipbuilding & Dry Dock Co.; James A. Farrell, Jr., President American South African Line, Inc.; Rear Admiral Leigh C. Palmer, Retired, Vice President American South African Line; and John G. Pew, President Sun Shipbuilding & Dry Dock Co.

There are two main vertical 3-stage Worthington air compressors of 150 cubic feet per minute to operate against a head of 600 pounds per square inch, each direct connected to a 65-horsepower motor. The ballast and bilge pump is a two-throw 12 x 12 inches Bethlehem-Weir reciprocator with a capacity of 1400 gallons per minute, driven by a 50-horsepower motor.

The refrigerating system consists of two 6-ton Brunswick-Kroeschell twin cylinder ammonia compressors, direct connected to 5 horsepower Diehl marine type motors, each assembled on the same base. The compressors are equipped with oil interceptors, with gage glasses and safety cocks and safety relief valves.

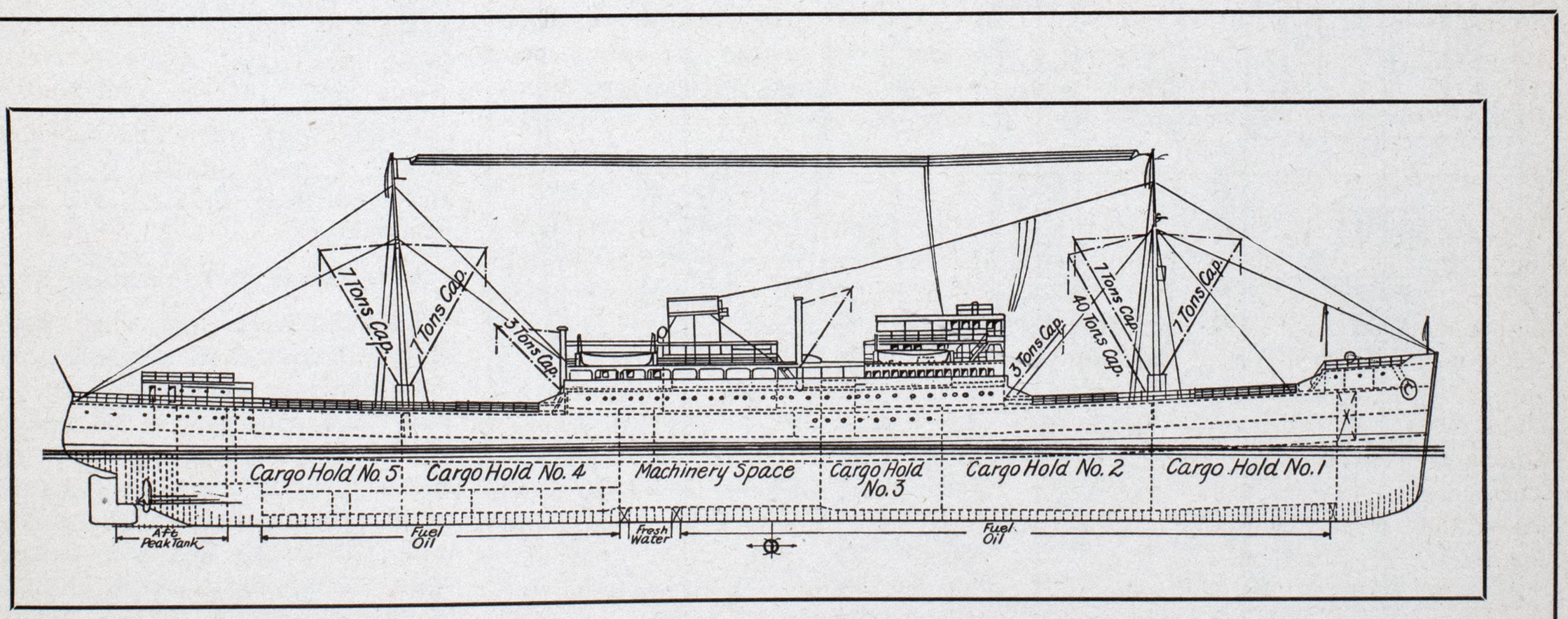
The balance of the engine room auxiliaries and other under deck auxiliary machinery, all electrically driven, comprises the following:

Additional Auxiliaries M. S. City of New York

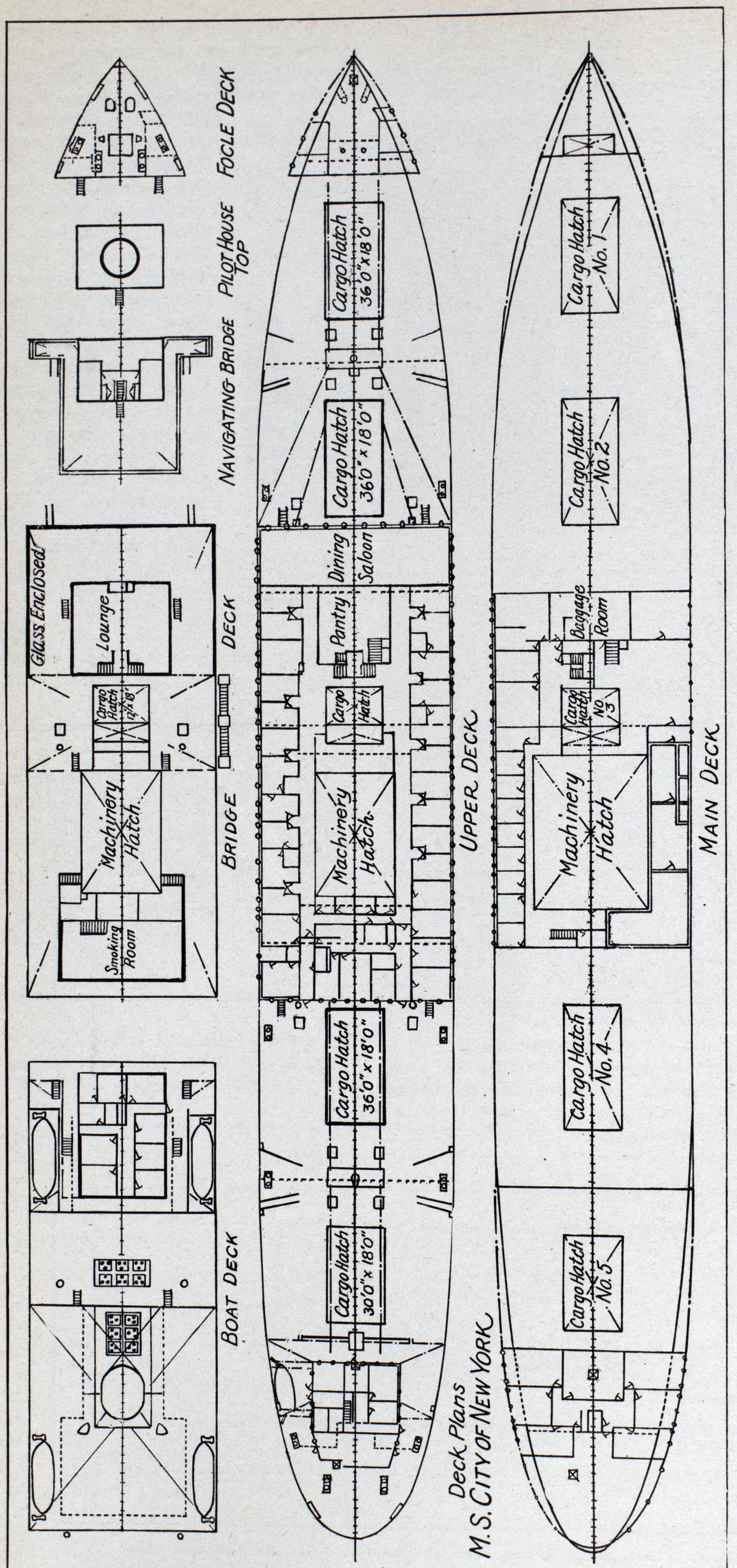
No. Motors	Service	Type	Horse Power
2	Main Engine Turning	Reversible Worm Wheel	20
1	General Service & Fire Pump	Centrifugal, 300 GPM	40
1	Salt Water Circulating	Centrifugal, 1400 GPM	50
2	Fresh Water Circulating	Centrifugal, 1400 GPM	50
1	Fire and Bilge Pump	Centrifugal, 300 GPM	40
1	Sanitary and Ice Machine	Centrifugal, 300 GPM	15
2	Lubricating Oil Pumps	Rotary, 200 GPM	12.5
2	Fuel Oil Transfer Pumps	Recip., 200 GPM	7.5
1	Engine Room Bilge Pump	Hor. Duplex, 200 GPM	7.5
1	Fuel Oil Purifier Pump	Centrifugal, 100 GPM	7.5
3	Fresh Water Pumps	Centrifugal, 50 GPM	3
2	Lubricating Oil Separators	Sharples	2
2	Fuel Oil Separators	Sharples	2
1	Refrigerating Machine	Condenser	5
1	Machine Shop		7.5

All of the foregoing motors are of the drip-proof, semi-enclosed self-ventilated type, with the exception of those which drive the main engine turning gear and the lubricating and fuel oil separators. These motors are of the totally enclosed type. Westinghouse drip-proof, semi-enclosed self-ventilated motors are designed primarily for marine service, and provide protection of the electrical parts from the moisture and dripping water so often encountered in under deck service. Two exhaust steam boilers of scotch type with single-furnaces, carrying a pressure of 75 pounds are installed. They are manufactured by the Sun company and are fitted with fuel oil burning furnace fronts. Diesel oil is used for fuel. Besides the boiler feed and filter tank there is a 20-ton steam evaporator, circulation being had from the sanitary pump of ample capacity.

There are three main air starting tanks or bottles, each of 150 cubic



Outboard Profile of New Twin Screw Motorship City of New York—Combination Cargo and Passenger Vessel



feet and a working pressure of 600 pounds per square inch. For the auxiliary generator diesel engines there is one air tank of 30 cubic feet capacity built for 250 pounds pressure, taking air either from the main tanks or the emergency compressor.

For fuel oil service there are three 15-ton settling tanks in the engine room, one being used for the separator, the other two for feed. Each is equipped with heating coils. For lubricating oil there are engine room tanks holding 4000 gallons of engine lubricating oil and 1000 gallons main engine cylinder oil. The tank for dirty oil is fitted with heating coils.

All bilge piping is copper expanded into cast iron flanges. All manifolds are of cast iron with brass valves. Wrought iron pipe is used for the ballast piping to double bottoms and peaks, as well as for the separate system of fuel oil piping. In the steam heating system, piping is of wrought steel with extra heavy cast iron fittings, except in the wheel house where brass is used. All piping in the fire system is of galvanized steel. Air and sounding pipes are iron with brass deck plates and gate valves.

Boiler feed is from the double bottoms. The culinary tanks in the 'tween decks will discharge to the 300-gallon gravity tanks fitted with steam coils. Running cold fresh water is piped to passengers' and crew's quarters, galley and laundry. Running hot fresh water is available on either side of passenger deck, laundry, barber shop, doctor's room and crew aft. Running cold salt water is piped to passengers and crew's baths, showers and toilets; while hot running salt water is provided to passengers', captain's and crew's baths or showers; although not all crew's quarters have running water. Both fresh and salt water is electrically heated except in laundry which uses steam coils.

The ship is equipped with a very complete work shop and specifications include a great amount of spare parts and extra gear for main and auxiliary machinery.

A Complete Refrigerating System

The ship's refrigerating system is of the Brunswick-Kroeschell type, and the following temperatures in degrees Fahr. are arranged to be maintained in the various refrigerator spaces: Meat, 28 to 32 degrees; vegetable, 40 to 50 degrees; fish, 28 to 32 degrees; milk, 36 to 40 degrees; butter and eggs, 36 to 40 degrees; chill, 40 to 50 degrees.

In addition to the above, the Bruns-

(*Continued on Page* 64)

Vice President Resigns After Long Service

Resigning as vice president of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., Frederick P. Palen concludes 35 years with a company in which he had long been prominent. His affiliation, in fact, dates back to within a few years of the company's organization in 1887, and in that time he became a force not only in the affairs of his company but in many of the more constructive efforts of the shipbuilding industry as a whole.

Born in Jenningsville, Pa., April 20, 1872, Mr. Palen was graduated from Cornell university in 1894 with a



FREDERICK P. PALEN

degree in mechanical engineering. Two months later he became a draftsman for the Newport News Shipbuilding company. In 1899, he became chief draftsman in charge of 150 men, or assistant plant engineer under C. F. Bailey. In those days the company had one drydock and five shipways and employed about 4000 men; today, it may be added, it has three drydocks and nine shipways, all of larger capacity, and employs about 7000 men, compared with the World war peak of 13,000 men and an average employment of perhaps 6000.

In 1912, Mr. Palen was made assistant general manager at the plant and three years later vice president, with offices in New York, in charge of the financial and contracting departments. With the advent of the World war, various commissions came to him as an official of the company.

The Newport News yards were repairing transports and other government vessels, turning them out at the rate of two a day. The war, in fact, lasted 500 days and during that time 1000 ships were repaired and sent to sea. This, it is justly claimed, was the company's greatest contribution to the war. True it had contracts for the construction of new ships, but the war ended before they ever could be put into service.

Following the armistice the shipbuilding industry soon was in a struggle for its very existence, with the darkest hour possibly some three years ago. It was during these years that Mr. Palen took his most active part in matters pertaining to the industry as a whole.

An organizer as well as an engineer, he was one of the charter members of the old Atlantic Coast Shipbuilders association, Philadelphia, and long one of its executive officers. Later when the scope of the association's work became extended, he was instrumental in the formation of a national organization, the National Council of American Shipbuilders, New York, and continued on as an executive of this association. Mr. Palen has long been active in the Society of Naval Architects and Marine Engineers and in the affairs of various organizations.

New N. G. I. Liner To Be Ready in 1932

The new 47,000 ton superliner to be built for the Navigazione Generale Italiana line for its New York-Mediterranean service will be named REX It is expected that a similar vessel ordered by the Lloyd Sabaudo line will be named DUX. Both of these vessels will be ready for service in 1932 and their construction is being made possible by the co-operation of the Italian government which not only is advancing a large loan but will also pay the owners a subsidy based on the speed of the two liners, which are expected to make 27 knots.

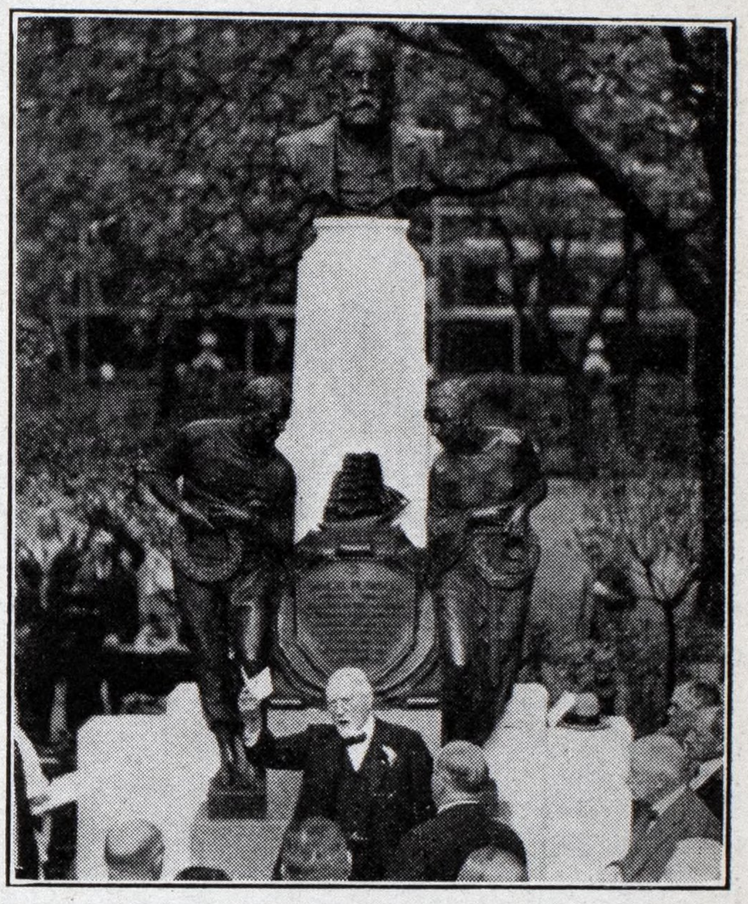
The new N. G. I. liner will have a registered tonnage of 47,000 and will be approximately 900 feet long. She will have four screws propelled by superheat turbines. She will have accommodations for 2000 passengers, 500 first class, 350 second cabin, 300 in intermediate second and 850 in third.

The total number of commercial vessels passing through the Panama canal during the year ended Dec. 31, 1929 was 6430 and the total tolls collected aggregated $27,592,715.84, exceeding the previous high mark for a year's toll collection (fiscal year 1929 with $27,127,376.91) by $465,338.93.

Samuel Plimsoll Honored By Steamship Owners

In the seventies and eighties there was no man in England better hated by the shipowners than Samuel Plimsoll, on account of his sincere but not always tactful campaign for the introduction of a load line. Yet, following closely on the VESTRIS inquiry, it was Sir Walter Runciman, the veteran British shipowner, who unveiled a memorial to his memory on the Thames Embankment, one of the finest sites in London.

Samuel Plimsoll was the originator of the Plimsoll mark which is painted on the outside of the hull on each side of British mercantile ships. This mark shows to what depth the ship may be loaded in fresh water and in salt water. The measurement is made



Plimsoll Memorial Unveiling in London

from the top of the statutary deck.

The appropriate position of the load line for any particular vessel can be obtained from tables which are published by the British Board of Trade.

Old Gunboat a Carferry

It is almost unbelievable that the carferry GOULDSBORO of the Texas Pacific Co., recently drydocked at the New Orleans plant of the Todd Shipyards Corp., should in fact be none other than the famous old Union gunboat CHICKASAW, constructed in 1863 at St. Louis. The CHICKASAW served with distinction under Admiral Farragut in the battle of Mobile bay. An inspection of her bottom, prior to making extensive repairs, showed that the hull was constructed of charcoal iron. Since it is known that such material had not been used in shipbuilding for the last 50 years, further examination brought out the facts of her true identity.

Build Modern Type Steam Turbines for Tankers

Four new oil tankers for which contracts have recently been placed are to be propelled by DeLaval geared turbines. Two are to be built by the Federal Shipbuilding & Dry Dock Co. for the Standard Shipping Co. of New York and two by the Bethlehem Shipbuilding Corp. for the Sinclair Navigation Co. The Standard Oil tankers are 444 feet long, 74 feet beam and 40 feet 6 inches deep, of 18,000 tons each and will draw 28 feet. They will be driven at 11 knots by DeLaval compound steam turbines with double reduction gears, rated at 4000 shaft horsepower and capable of developing a maximum of 4400 horsepower.

The two Sinclair tankers will be 331 feet long, 57 feet beam, 32 feet deep and 24 feet draft, and will be rated at 8400 tons. They also will be equipped with compound turbines with double reduction gears built by the DeLaval Steam Turbine Co.

Marine steam turbines of this size and type, using high pressure, high temperature steam, regenerative feed water heating, air heaters and economizers to improve boiler efficiency, are capable of developing a shaft horsepower on an oil consumption of around .6 pound to .7 pound per hour, including steam used for all purposes on shipboard.

The United States shipping board on Jan. 8 agreed to advertise the SS JALAPA and the EMERGENCY AID for sale, bids to be received at noon Jan. 27. The EMERGENCY AID, which has been operated under charter by the Pacific Argentine Brazil line, will be at San Francisco for delivery under the proposed sale. She is a steel cargo steamer of 8727 deadweight tons, equipped with Westinghouse geared turbines and Babcock and Wilcox oil burning boilers. The JALAPA is a steel cargo steamer of 9407 deadweight tons.

Foreign Trade in 1929 Breaks All Records

The year 1929 was a record breaker in our foreign trade, according to a statement made Dec. 31 by William I. Cooper, director, bureau of foreign and domestic commerce. Both exports and imports showed an increase over the preceding year and reached totals which, when adjustment is made for the changes in the buying power of money, decidedly surpass any attained even during the war and the immediate post-war boom. In the absence of December figures, it is estimated that American exports during 1929 will amount to about $5,300,000,000 or from 3 to 4 per cent more than during the preceding year and imports to about $4,450,000,000, an increase of 8 per cent.

This gratifying result was not brought about by any temporary causes. It marks the continuance of a record practically unbroken.

Bids Asked on Twelve Mail Contracts

ON JAN. 17, Postmaster General Brown issued advertisements under authority of the merchant marine act of 1928 on 12 ocean mail routes as follows:

Route No. 19—New York to Puerto Colombia, calling for a weekly service with 10½ knot vessels. Three new 16-knot ships to be provided within five years. Bids will be received until noon, Feb. 25.

Route No. 35.—New Orleans to Rio de Janeiro, Buenos Aires, Montevideo, Bahia Blanca, calling for not less than 36 nor more than 52 trips per annum with 10-knot ships. Four 13-knot ships to be provided within two years and two additional ships within seven years. Bids will be received until noon March 31.

Route No. 37—San Francisco to Puerto Colombia, calling for 26 trips per annum with 13-knot ships. Two 18-knot ships are to be provided within three years. Bids will be received until noon Feb. 25.

Route No. 38—Tacoma to Valparaiso, calling for 17 trips per annum with 10-knot ships. One 18-knot vessel to be provided within three years. Bids will be received until noon Feb. 28.

Route No. 39—San Francisco to Puerto Armuellas, calling for a weekly service with 11½-knot vessels. Three 16-knot ships are to be provided within three years. Bids will be received until noon Feb. 28.

Route No. 40—New York to Port Limon, calling for a weekly service with 13-knot vessels. Three 16-knot vessels are to be provided within three years. Bids will be received until noon Feb. 28.

Route No. 41—New Orleans to Puerto Colombia, calling for a weekly service with 11½-knot vessels. Two 16-knot ships are to be provided within five years. Bids will be received until noon Feb. 28.

Route No. 24.—New York to Southampton, calling for 16 trips per annum with 24-knot ship. Two 28-knot vessels are to be provided within four years. Bids will be received until noon Feb. 25.

Route No. 43—New York to Hamburg, calling for a weekly service with 16 and 18 knot ships. Two 20-knot vessels are to be provided within five years. Bids will be received until noon Feb. 25.

Route No. 44—New York to London, calling for a weekly service with 16-knot vessels. The contract is to be for five years, to be extended for an additional five years contingent upon providing two 18-knot ships. Bids will be received until noon Feb. 25.

Route No. 45—New Orleans to West Mediterranean ports, calling for 32 trips per annum with 10-knot vessels. Two 15-knot ships are to be provided during the term of the contract. Bids will be received until noon March 31.

Route No. 46—Baltimore to Hamburg, calling for 52 trips per annum with 16-knot ships with possible replacement by two 18-knot ships after five years. Bids will be received until noon Feb. 25.

All contracts offered here are for a period of ten years, except the New York-London route which may be extended as indicated. Under the above contract 30 new ships will be built of an approximate total tonnage of 300,000.

Thirty Ships Required to Cost $175,000,000

SO MUCH real progress has already been made in making practical use of the mail contract and construction loan provisos of the Jones-White Act that Postmaster General Brown's request for specific bids on twelve additional mail routes involving the construction within a comparatively brief period of 30 ships, aggregating 300,000 tons, at an estimated cost of $175,000,000, can be taken as a definite indication not only of the sincerity but the effectiveness of President Hoover's administration of the law. This is surely action of the first order and care must be used in awarding contracts so that the main objective will be attained. The new construction called for should be carried through without fail and with no undue delay.

—Editor's Note

British Shipping and Shipbuilding

Shipping Revival Not Realized—Passenger Travel Increases—Shipbuilding in Better Shape with Improvement in Sight—Freight Rates Decline

By Frank C. Bowen

THE year just past is rather a difficult one to estimate, and can best be described as being distinctly patchy. The long-expected shipping revival has not yet matured and after flashes of promise during the year the shipping industry finished in a discouraging position. On the other hand, shipbuilding was distinctly better, and the year as a whole being fairly satisfactory, with considerable promise of improvement in the future.

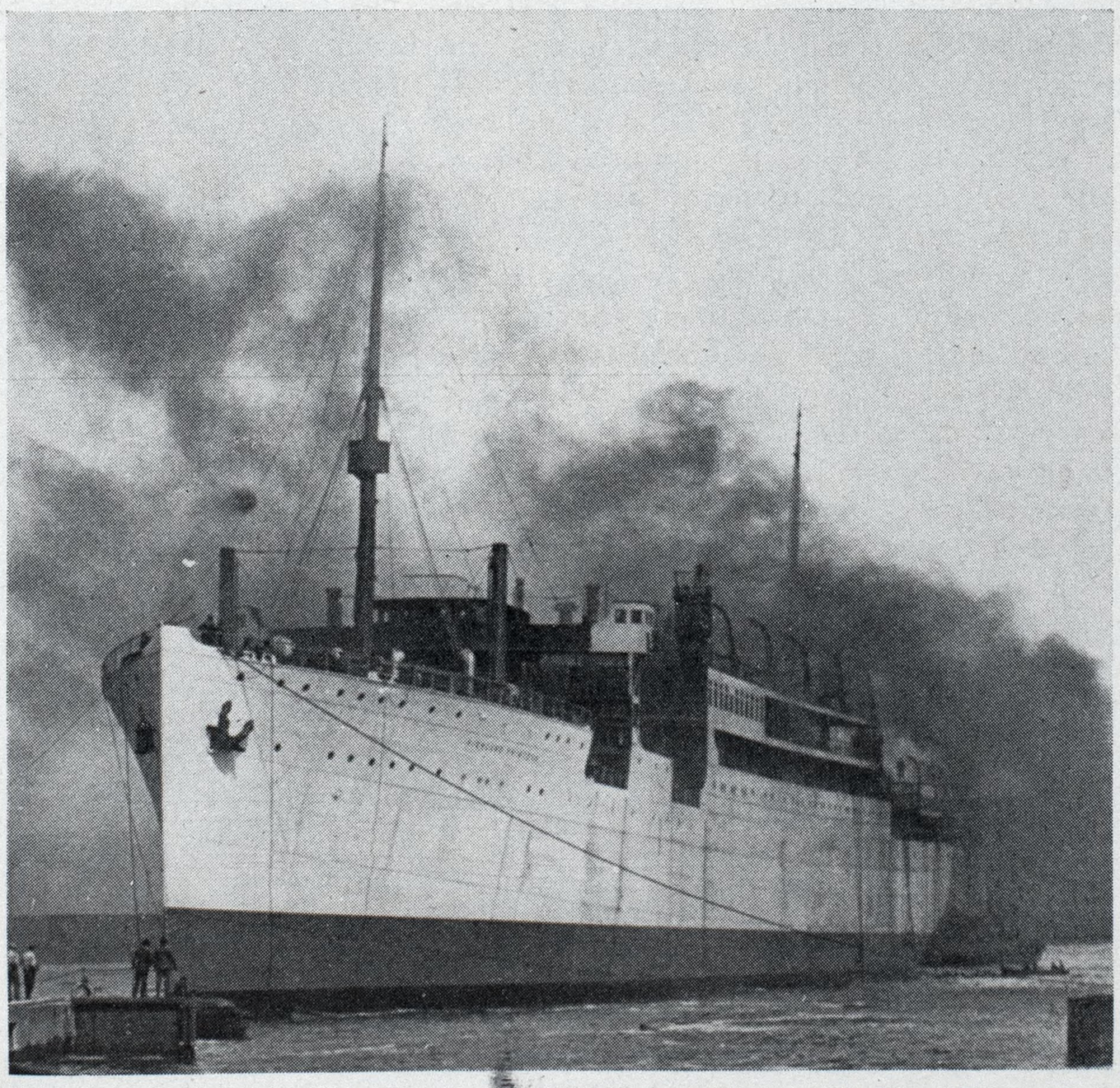
In regard to passenger trade, there still is to be noted a steady increase in the public taste for travel, not only on the regular routes but also on the yachting cruises to which most of the companies now devote their surplus tonnage during the slack period. Increased favor also has been shown to purely pleasure trips by liners on their regular service, the trip from England to the intermediate Mediterranean stops of the Indian, Australian and Eastern liners, returning by the next ship calling, being particularly noticeable. On the Western ocean the capture of the blue ribbon by the North German Lloyd BREMEN resulted in the Germans getting a good deal of passenger business from the British toward the end of the year, but this loss was minimized by public appreciation of the gallant fight made by the veteran MAURETANIA, and the comparative loss was not nearly as great as when the Germans first won the blue ribbon in 1897. On most of the main routes the second-class accommodation again has failed to find very much favor, the new cabin ships eating into its trade very seriously. This is particularly noticeable on the North Atlantic, but the cabin tendency now is spreading to nearly all the other routes, and even the third-class tourist business is no longer confined to the Western ocean. The unemployment situation in several of the British colonies and dominions has caused a slackening of emigration during the last quarter, especially when it is assisted by the state, but this has to a certain extent been replaced by increased tourist business.

As far as the rapidly increasing fleet of fast cargo liners is concerned, the year has not been at all bad, for more and more shippers show their preference for speed, and the cargo liner still is biting into the tramp business more and more every year. This relative prosperity is due to a certain extent to the modernity of the British merchant service, forced upon the owners by the German submarine blockade. The latest official figures give 10,673,000 tons of British shipping as under ten years old, 7,889,000 between 10 and 20, and 4,280,000 over 20. These figures are better than they have been for many years past, and show signs of improving further in 1930.

On the other hand, the purely tramp tonnage has been very hard hit, particularly at the end of the year, when the serious slump was very largely due to the glut of grain in the European markets, until the average level of freights finished well below the average even of 1923, when shipowners could not see how they were to carry on with the freights offered. The accompanying chart of index numbers, compiled from *The Statist*, London, shows the decline of freights down to November, when the lowest figures since May, 1926, were reached.

For the latter half of the year there has been a noticeable decline in the value of most shipping securities, which culminated in a dramatic slump at the end. The companies principally affected were those of the Royal Mail Steam Packet Co.'s group, but many other concerns felt the tendency to a greater or lesser degree.

As compared with shipping, the shipbuilding side has been brighter, and 1929 may be written down as one of the best years since the end of the boom in 1922. In the summer the sudden falling off of orders looked forbidding and threatened a crisis during the winter months, when they were most needed, but it was followed by quite a rush of orders for cargo ships and tankers. Comparatively few passenger-liners were placed during this period, as naturally the needs of the passenger companies were satisfied first, and most of the lines are well supplied at the moment. The effect of this change of character has been to move the center of prosperity from the Clyde to the Tyne. The greatest feature of the shipbuilding year was, however, the sudden demand for tankers which arrived in the autumn, just when the market was deemed to be practically dead. The great majority of these orders are for diesel-engined vessels on Norwegian account, most of them going to various yards on the North-East coast, and the success of the British establishments



Highland Princess—Twin Screw Passenger and Refrigerated Cargo Motorship. Last of Five Built by Harland & Wolff for Nelson Line

against German competition is particularly gratifying. It was very largely due to these tankers orders, which continued almost down to the end of the year, that in the autumn it was reckoned that 51.4 per cent of the world's total tonnage under construction was being built in British yards, and 43.2 per cent in September, 1928.

Promise of Good Labor Conditions

The situation also has been considerably assisted by better relations with labor. A most unfortunate and prolonged strife among the joiners employed in the Belfast yards threatened to spread all through the industry, and although this was prevented at the last moment, the trouble has held up the completion of the White Star cabin Atlantic liner BRITANNIC and many other important ships. The trouble led to the Belfast shipyards returning to the Shipbuilding Employers' federation, from which they had been divided for some years, and there is a better chance of industrial disputes being avoided in the future.

Another promise of good relations is contained in the end of the men's old grievance concerning unequal rates in various parts of the country. After a number of conferences it was found possible to equalize time rates right through the industry, skilled plain time workers receiving a basic wage of 50s, with 10s bonus, while unskilled workers have a basic wage of 31s, and the same bonus. The rates for semiskilled labor are arranged accordingly. This arrangement led to a general increase of wages which the industry could ill afford at the moment, particularly when it was provided that no reduction should be effected in districts where specially high rates obtain, but the increased possibility of peace is very valuable to owners and workers alike.

In spite of this improvement, however, the unemployment in the shipbuilding industry in Britain still is over 20 per cent, the worst of the heavy industries, and although this is steadily declining, the improvement is slow. It must be remembered that this improvement is partly due to natural wastage as well as to more work.

The industry also is very hard hit with regard to naval work, which in pre-war days amounted to 25 per cent of the total shipbuilding in the country. Latterly it has been nearer 5 per cent, but even this small proportion still is shrinking with numerous contracts cancelled, and the armament firms especially those which have experienced difficulty in turning over their plant to peace operations, are very hard hit.

It is generally agreed that there will be no real prosperity in the shipbuilding industry until the surplus berths are wiped out, reckoned to be 20 per cent at least. This surplus was, of course, due to the war efforts to counter the German submarine menace, when the government forced the shipbuilders into large expansion for which there was no prospect in peace time. The shipbuilders, in fact, feel that they were rather badly treated by the government in this matter, and during the year several yards found themselves unable to weather the storm and closed down, unlikely ever to reopen at least under present owners.

Progress in Marine Engineering

On the engineering side the year in Britain has been marked by a steady increase in the number of diesel installations built, almost invariably in new ships. The majority of these diesels are of continental design, built under license, the alliance between Burmeister and Wain, of Copenhagen, and Harland and Wolff, of Belfast, being particularly conspicuous, but considerable progress has been made in purely British designs, of which the policy has almost invariably been improved reliability and economy. For the higher powers, British tastes still turn toward steam.

In steam there has been a steady increase in pressure noticeable, high-pressure steam having been tried in more and more types. The navy now is turning to it, and John I. Thornycroft & Co., Ltd., the well-known destroyer builders, are constructing the first British destroyer to be given high-pressure machinery, H. M. S. ACHERON. With an increase in pressure has come a noticeable decline in the old prejudice in the merchant service against the use of water tube boilers, this means of raising steam having become very much more popular. Yarrow & Co., Ltd. and Babcock and Wilcox, Ltd., both famous for the boilers which they have built for men-of-war, have been pre-eminent in this movement.

Greater Economy in Marine Engines

For a long time, also, British engineers have looked askance at the American fondness for the electric drive, but the P. and O. line took the plunge by having built, by Alexander Stephen & Sons Ltd., of Linthouse, Glasgow, the turbo-electric liner VICEROY OF INDIA, a 19,000-ton 19-knot ship designed for the London-Bombay mail service. The contract for this service is peculiar, in that it provides for two quite different speeds, but the VICEROY has found herself able to satisfy one with one turbo-generator running and the other at full speed. Her success has aroused very considerable interest all over the shipping and shipbuilding world, and her owners are sufficiently satisfied with her to have announced their intention of placing contracts for two slightly bigger ships, similarly engined, for the Australian service.

The Bauer-Wach system of combining a low-pressure exhaust turbine with a reciprocating engine also has found favor, the P. and O., Anchor, Clan, and many other companies having obtained satisfactory results by adding the turbine to an existing reciprocating set. Both economy and additional speed have been obtained, and quite a number of cargo ships, some of them slow tramps, now are being built on this principle. The Ellerman and P. and O. lines have just tried a variation of this experiment by making the exhaust turbine drive a generator, the motor being coupled to the shaft.

Several British shipowners also have seen virtue in the Lentz poppet-valve engine, which has been pushed in Sweden, the makers being sufficiently

(*Continued on Page* 59)

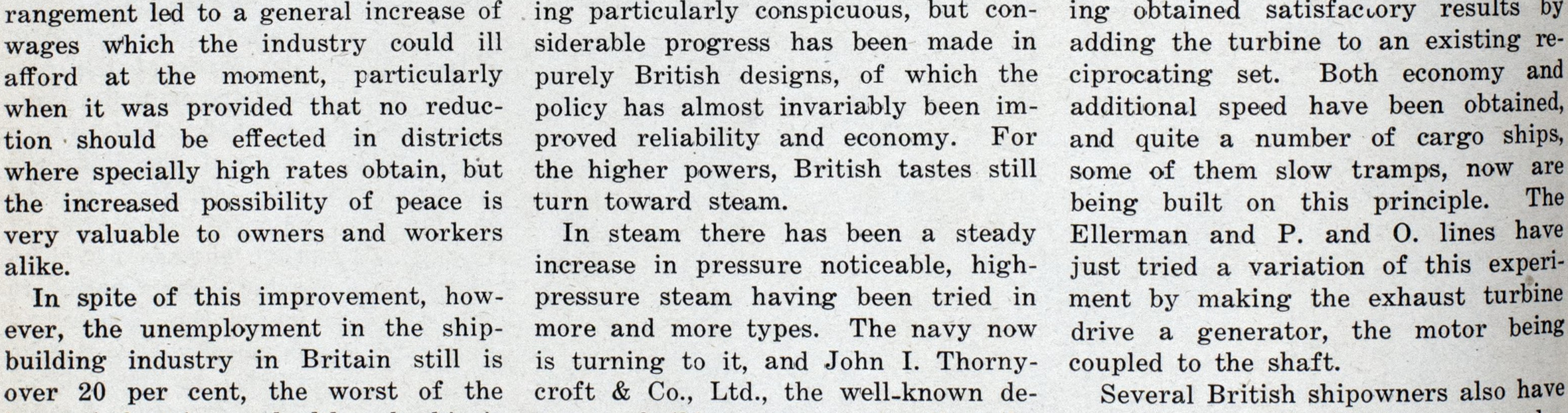
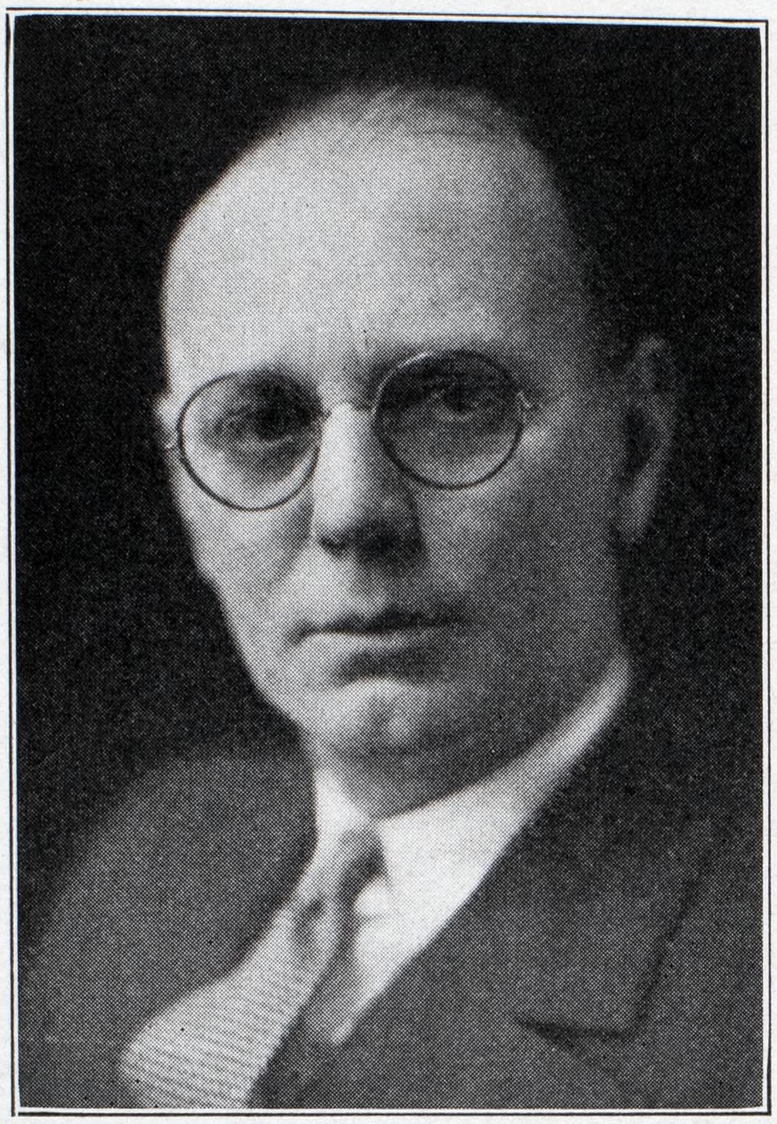


DIAGRAM SHOWING FLUCTUATION OF FREIGHT RATES FOR FOUR YEARS AND ELEVEN MONTHS

MEN of MARINE AFFAIRS



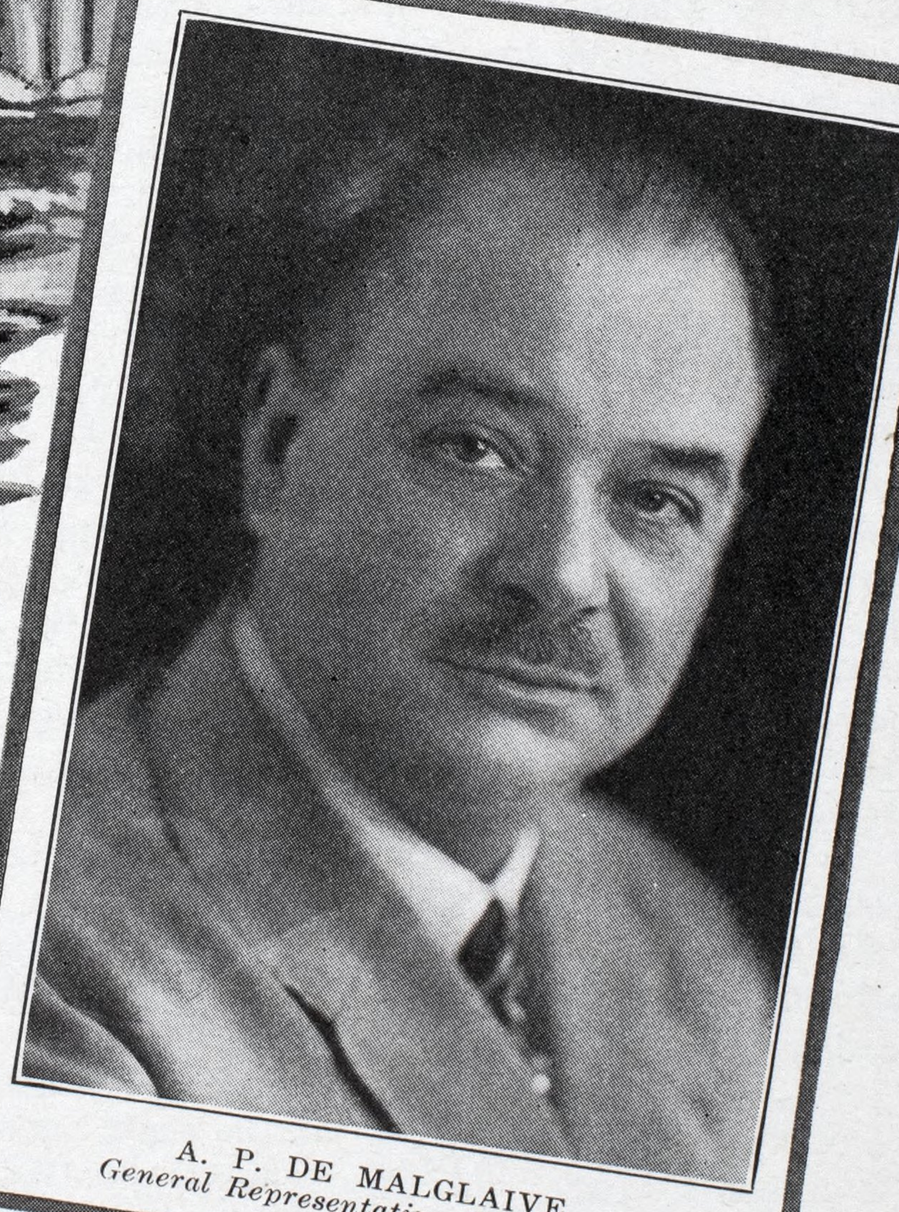
B. R. TEWKSBURY
Vice President, Becker Steamship Co.



J. L. WALLACE
Assist. to President, American Ship Building Co.



H. E. JONES
President, James W. Elwell & Co.



A. P. DE MALGLAIVE
General Representative, French Line

Photos by Blank-Stoller, Inc.

Extensive Repairs Made on Pacific Spruce

An extensive ship repair job is nearing completion at the Robins plant of the Todd Shipyards Corp. on the Dimon line freighter PACIFIC SPRUCE which went ashore Sept. 9. on Morant Bay, Jamaica, B. W. I. The vessel was so badly damaged by the pounding of the seas that she had to be towed into Kingston, Jamaica, for temporary repairs after 1,500,000 feet of lumber had been jettisoned to float her and then was towed to New York for permanent repairs.

The work being done on the PACIFIC SPRUCE includes renewal of practically all of the bottom plating and removal and fairing of all internal connections, many of which had to be renewed. The engines and shafting, including the tail shaft and propeller, had to be removed and one new section of bedplate was placed under the main engine to replace the original one which had been cracked when the bottom buckled, throwing up the engines and boilers and twisting the bulkheads. The main boilers have been lifted and tank tops, engines and boilers repaired and partly renewed.

A new tail shaft has been fitted and practically all of the crank shaft has been renewed. Several new bearings have been placed on the main shaft and a new rocker shaft supplied. During the operation all of the line shafting has been tested in lathes at the Robins plant.

All tanks throughout the vessel are being tested and made tight and all cargo holds cleaned and recoated. The bilges also are being cleaned and recoated. In addition several minor repairs have been made in the quarters of the officers and crew and all other parts of the vessel are being cleaned and recoated.

Earnings Show Increase

On Jan. 16, the board of directors of the International Mercantile Marine Co. declared a dividend of $1 a share on the outstanding no par shares of this company, payable Feb. 15. This was out of earnings for the year 1929. Estimates were submitted at the meeting which indicate that the operations of this company and its American subsidiaries for the year 1929 will result in a profit of about $2,400,000 after providing depreciation on American steamers.

Appropriations of Naval Construction Bill

The naval construction bill, sponsored by Secretary Adams and recently approved by the house naval committee, calls for the expenditure of $10,077,500 for improvements at naval stations along the continental coasts in Hawaii and the Panama canal zone. The committee also made public the naval general board's recommendation that Camp Kearney, Calif., be selected in preference to Sunnyvale, Calif., as an airship base.

Under the construction bill Pearl Harbor, Hawaii, would be allotted $1,700,000 for waterfront and channel improvements, $390,000 for buildings at the submarine base and $249,000 for torpedo storage at the naval air station.

San Diego station would be allotted $425,000 for a floating dry dock, $550,000 for naval air station and $421,500 for training station.

Navy yard, Mare Island, Calif., $435,000.

Navy yard, Puget Sound, Wash., $1,535,000.

Canal zone, air station, $210,000; naval base, $93,000; submarine base, $240,000, also at this location.

World Shipbuilding Shows Large Gain

WORLD shipbuilding is now at the highest point reached since the end of 1927, and is almost at a level with the rate of production just before the war, according to a statement recently issued by Lloyd's Register of Shipping. With the exception of the total at the close of 1927, which was only eight thousand gross tons more than the present figure of 3,110,000 tons, the current aggregate is the largest since the end of the war-building boom in ship construction.

As compared with the previous quarter, ending Sept. 30, 1929, the present total shows a gain of nearly 300,000 gross tons. For Great Britain and Ireland an increase of over 110,000 tons is shown; and for the United States, of 67,000 tons. Conditions in the last two quarters are compared in the following table of gross tonnage:

	Dec. 31, 1929	Sept. 30, 1929
Great Britain & Ireland	1,560,254	1,448,355
United States	179,062	112,010
Other countries	1,371,564	1,256.974
World total	**3,110,880**	**2,817,339**

At this time a year ago, the world construction total was 2,618,000 gross tons, of which Great Britain and Ireland were building 1,243,000 tons; the United States, only 48,000 tons, and the other maritime countries combined, 1,327,000 tons.

New tonnage on which work was begun throughout the world during the quarter just ended represented almost 150,000 gross tons more than the aggregate of tonnage launched during the same period; whereas in the previous quarter launchings were about 50,000 tons more than new work commenced.

The contrast in the last two quarters between the work begun and that sent down the ways towards completion is shown in the following tables, the figures representing gross tons:

	Dec. 31, 1929	Sept. 30, 1929
Launchings		
Great Britain & Ireland	472,683	368,465
Other countries	357,257	339,630
World Total	**829,940**	**708,095**
New Work		
Great Britain & Ireland	495,990	360,087
Other countries	476,434	297,773
World total	**972,424**	**657,860**

A gain of more than fifty per cent in the construction of steam and motor tankers, of 1000 gross tons and upwards, was shown during the past quarter. Of the total increase of over 225,000 gross tons, the gain by Great Britain and Ireland alone is 171,000 tons. The comparison between the last two quarters in this type of construction is shown by the following table of comparative gross tonnage:

	Dec. 31, 1929	Sept. 30, 1929
Great Britain & Ireland	397,559	226,412
Other countries	230,197	174,501
World total	**627,756**	**400,913**

Germany more than doubled her tanker tonnage under construction during the last quarter, with a total of 74,445 gross tons, as compared with 33,100 at the end of last September. During the same period the total tanker tonnage building in the United States advanced from 17,800 tons to 28,700.

A further sharp advance in the construction of motor vessels equipped with internal combustion engines is shown by Lloyd's returns. The quarter ended Sept. 30, last, showed a gain of about 100,000 gross tons over the total for the previous quarter; and the quarter just ended shows an additional gain of over 200,000 tons. And, as compared with a year ago, over 340,000 tons more of this type of shipping is now being built.

The increase in motorship building has been considerably greater than that for all other types of vessels combined. As a result, about 365,000 gross tons more of motorships are now being constructed than of all other kinds taken together, as com-

pared with a lead of about 250,000 tons in the September quarter. About fifty-six per cent of the entire world's shipbuilding, therefore, is being devoted to motor vessels. A comparison between the last two quarters is shown in the following table of gross tonnage:

	Dec. 31, 1929	Sept. 30, 1929
Motor Vessels	1,737,834	1,531,753
Other Types	1,373,046	1,285,586
World total	**3,110,880**	**2,817,339**

Slightly over forty-nine per cent of shipbuilding in Great Britain and Ireland at present is of boats with internal combustion engines. A year ago the proportion was forty-three per cent. For the other maritime countries, combined, about sixty-three per cent of the current construction is motorships; proportionately the same as it was a year ago. Lloyd's shows the contrast between the two groups for the past quarter, in gross tonnage, as follows:

	Britain & Ireland	Other Countries
Motor Vessels	765,912	971,922
Other Types	794,342	578,704
World total	**1,560,254**	**1,550,626**

The United States is still devoting only about a fourth of its construction program to motor vessels; and Germany's proportion is less than forty per cent. But Russia, and Holland's present production is about eighty per cent motorized ships, and Japan's, Denmark's, and Sweden's about 90 per cent.

The total indicated horsepower for oil engines was 1,501,923 at the end of the December quarter, as against 1,334,240 at the close of the September quarter. Except in the case of Italy, which showed a drop from 115,200 indicated horsepower to 112,440, all countries reported showed increases over the previous period. For Great Britain and Ireland, there was an advance, from 424,474 indicated horsepower to 462,927. Denmark's total went from 180,850 to 185,785, Germany's from 88,145 to 147,605 and Holland's from 109,690 to 122,946. For Sweden, the gain was from 94,414 to 108,790, and for Switzerland, from 88,530 to 103,120. Japan's total grew from 84,480 to 102,020; and for the United States there was an increase from 31,547 to 52,040.

The gain in the indicated horsepower of reciprocating steam engines during the December quarter was slight, the total for all countries advancing only from 520,776 to 539,570. The aggregate for Great Britain and Ireland went from 360,521 to 369,725; that for Germany from 57,675 to 60,940, and for the United States, from 4400 to 8000.

How the building of motor vessels has compared during the past two quarters in the various countries is shown in the following gross tonnage table:

	Dec. 31, 1929	Sept. 30, 1929
Great Britain & Ireland	765,912	651,875
Holland	192,328	189,829
Japan	165,570	148,610
Russia	100,595	88,569
Denmark	96,314	75,655
Sweden	87,260	103,292
Germany	85,955	47,984
United States	42,990	31,300

A greater increase was reported to Lloyd's in the total shaft horsepower of steam turbines being built or installed throughout the world, the figure advancing from 434,955 to 509,880 shaft horsepower. For Great Britain and Ireland the gain was from 245,040 to 278,365; and for the United States, from 92,200 to 102,800.

While the four leading shipbuilding countries in the September quarter, Great Britain and Ireland, Germany, Holland and Japan, retained their rank, in the order named, during the December quarter, a number of the other countries' rankings were changed. The United States, which stood seventh at the end of September last, advanced to fifth position. The volume of merchant ship production for the various countries in the last two quarters is shown by the following table of gross tonnage for those periods:

	Dec. 31, 1929	Sept. 30, 1929
Great Britain & Ireland	1,560,254	1,448,355
Germany	253,256	235,499
Holland	231,934	224,029
Japan	183,570	156,810
United States	179,062	112,010
France	167,177	135,776
Russia	121,069	112,073
Denmark	104,589	80,855
Sweden	98,440	111,427
Italy	77,919	69,834

Great Britain and Ireland are still building more merchant shipping tonnage than all other countries combined; but now hold this position by a very slight margin, the percentage being 50.16 as compared with 51.4 per cent at the end of the September quarter. The proportion of the world's ship production being done in the United States, however, advanced in the same period from 3.9 per cent to 5.7 per cent.

Smoke Abatement with Steam Air Jets

By E. L. Lannert

THE passenger ships of the Cleveland and Buffalo lines have been battling with the smoke problem for a number of years. These ships ply between Buffalo and Cleveland. Both cities have smoke ordinances and smoke inspectors. In 1925 a patent steam jet smoke consumer with a dashpot operating mechanism was installed on one of the boilers. This device reduced the smoke but the objections were the roaring noise of the steam jets and also the considerable amount of adjustment required by the dashpot.

In 1927 considerable time was spent in training the firemen to use the alternate method of firing while in port. A great improvement was made in this way, the average minutes dense smoke being reduced from 12 minutes to four minutes dense smoke per hour. However, there were still many violations.

During the winter of 1927, the chief engineer experimented with steam air jets over the firedoor in the windbox of one of the two-furnace, forced draft scotch boilers. These jets were very simple, being made of a 2-inch pipe, 10 inches long, a 3 to 2-inch reducing coupling, and a ¼-inch nipple and toe welded in place. A ¼-inch plug, drilled with 3/32-inch hole, acted as the orifice and was rigidly held in line with the 2-inch pipe.

During 1928 these smoke consumers were thoroughly tested, and it was found that two steam air jets for each grate (4 feet wide x 6 feet long) were sufficient. By having them point to the bridgewall, midway between

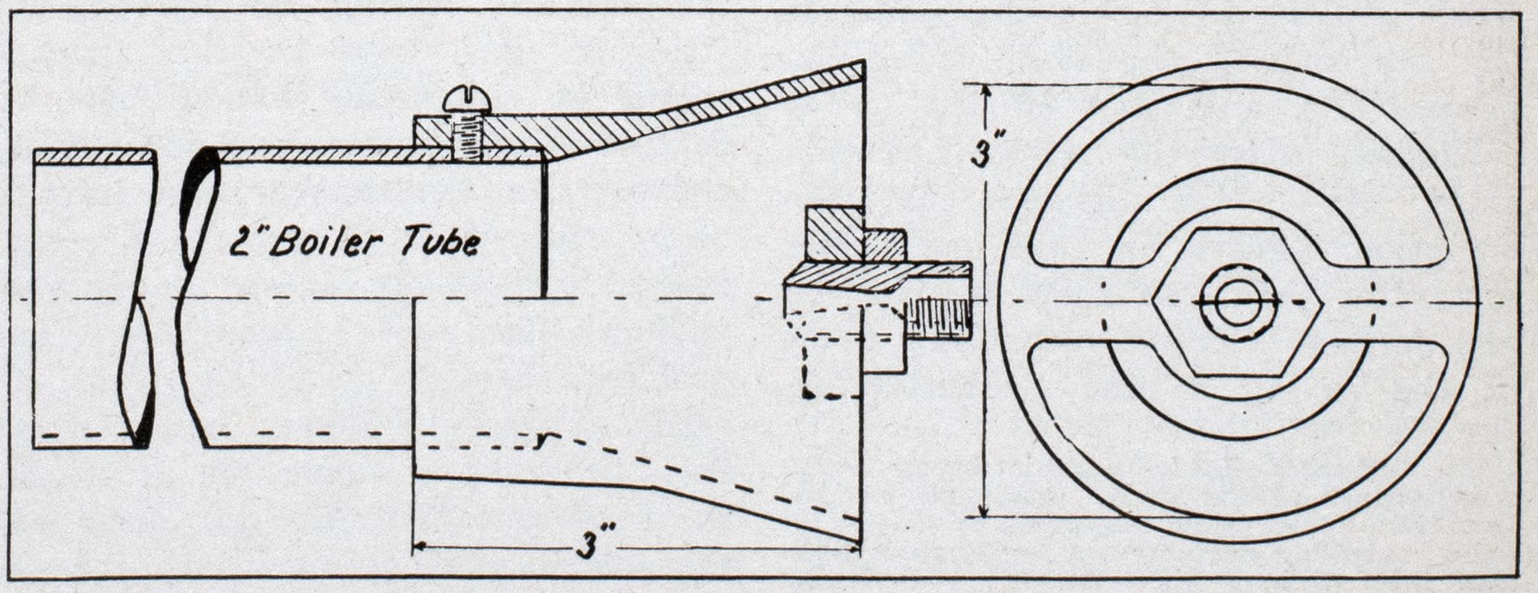


FIG. 1—SECTION AND END VIEW OF STEAM AIR JET AS USED ON THE PASSENGER VESSELS OF THE CLEVELAND & BUFFALO TRANSIT CO.

the top and bottom, there were no bad effects on either grates or bridgewall. The noise was very much muffled by the windbox.

In the winter of 1928-29 it was decided to equip the boilers of all four passenger ships. As about 100 steam air jets were needed it was considered advisable to make a pattern and have them made by the maintenance department. The design and installation is shown in Figs. 1 and 2.

After the ships were thus equipped, it was still necessary to instruct the firemen to open the steam valve before firing and to close it again after about five minutes. That the firemen were well trained on the Cleveland

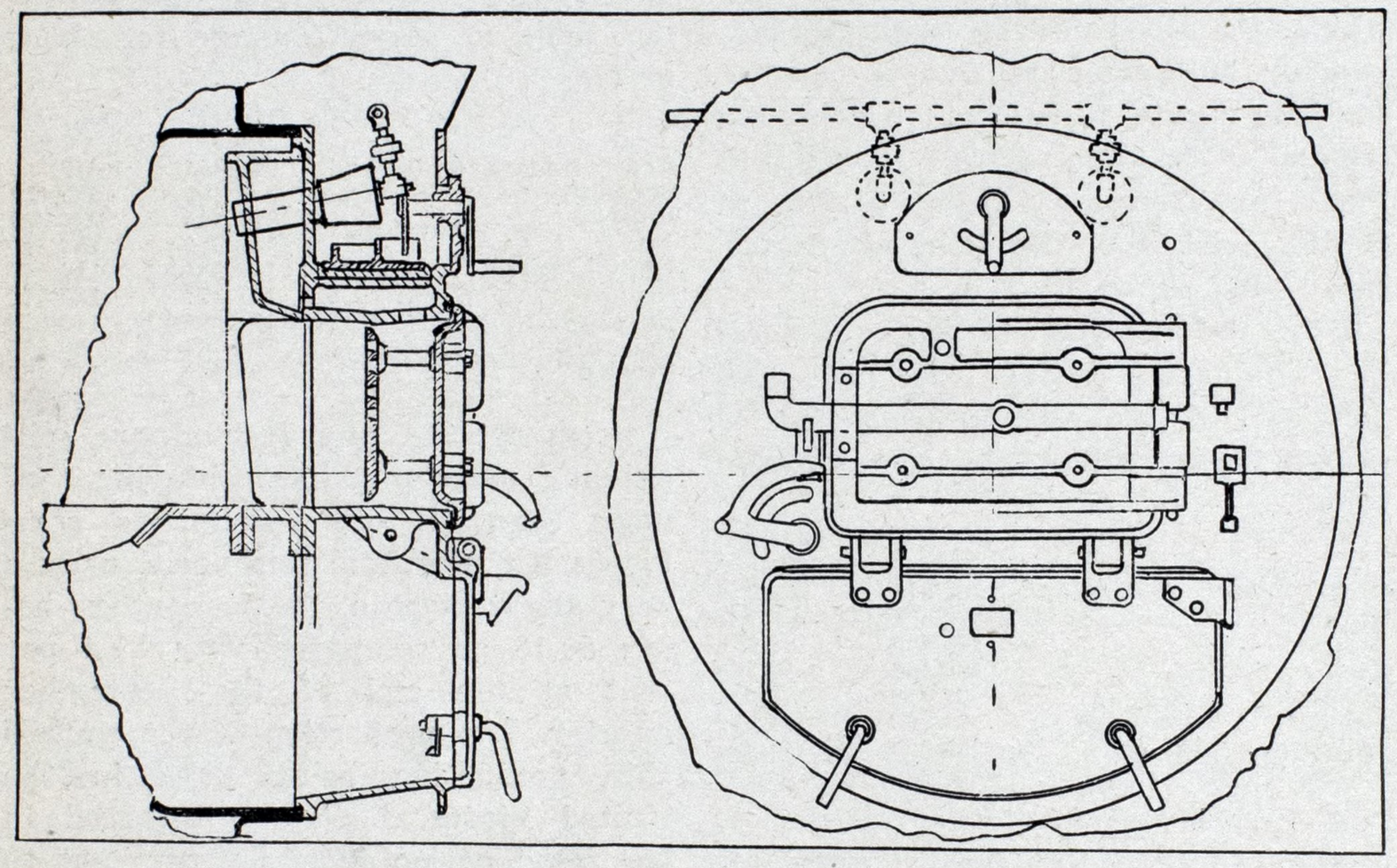


FIG. 2—FURNACE FRONT SIMILAR TO THAT ON THE SEEANDBEE, BUFFALO AND ERIE WITH STEAM AIR JET SHOWN IN FIG. 1, INSTALLED TO REDUCE SMOKE

and Buffalo line ships is shown by reports in which the average reading taken on the three ships over a three-month period was 2½, ¾ and ¾ minutes dense smoke per hour. This is an improvement of 40 per cent over the previous year.

There had been some question about the effect of the smoke consumers on the coal consumption, and in this connection Mr. Turnbull, fleet engineer of the Cleveland and Buffalo line stated: "We all know that smoke is unconsumed carbon, and as such, it is a waste of fuel. Also, blowing steam on the fire and up the stack is an expense. Our men shut off the smoke consumers after the smoke has subsided. As to the ultimate coal consumption, figures on coal use before and after their use show no increase and perhaps a slight reduction. Some of the saving is due to better operation in the firehold which would naturally accompany any diligent effort to reduce smoke."

Comments on Foregoing

By Victor J. Azbe

IT HAS been proven that sufficient air can not penetrate through an active fuel bed to assure complete combustion, especially not when the combustion rate is high, when furnace walls are air tight and the whole under forced draft. Secondary air then is necessary. This particularly so when fresh coal is fired, the air coming up through the coke on reaching the green coal has most of its oxygen used up. There is not enough of it to burn the gases and vapors that are being distilled. In consequence of this incomplete combustion evolution of smoke is the result.

Since continuous coal firing is the ideal, a steam jet for the purpose of smoke abatement is merely a compromise but as such can serve two purposes—first creation of turbulence and second admission of over fire air. In all cases the maximum amount of turbulence is desirable. The stream low in oxygen should be mixed with the streams having an excess, the stratified gas flow in the furnace should be completely broken up. To do this energy is required and the jet causing the disturbance must have a deep penetration. Where there is sufficient air already present additional amounts need not be admitted. The problem then is to utilize what already is present. Where, however, the fuel, the rate of firing, the grate, or the furnace construction are such that there is insufficient air in the furnace when the volatile gases are being distilled off as is ordinarily the case in marine practice, then, of course, additional air must be supplied and that in a proper amount. From this, it becomes evident that no device is fully suitable in all cases and must be adapted to the conditions. So adapted, it however, becomes of value not only in reducing smoke but also as a means of saving fuel.

The device described by Mr. Lannert has this two-fold purpose—first it admits more air to the furnace; second, it creates turbulency, that is, brings the air, brought in with the steam and other air that may be in the furnace, more rapidly in contact with the combustible gases. There is the further advantage of cheapness.

Some Further Comments

By Samuel G. Frantz

THE owners and operators of towboats in New York harbor have evidenced considerable interest and a willingness to co-operate in the reduction of smoke. The use of smokeless fuels and of smoke reducing apparatus indicates the desire of the owners to co-operate. Several boats are using steam air jets similar to those described, with good results.

The New York and New Jersey smoke abatement board is sponsoring tests of this commercial equipment at Stevens Institute of Technology, Hoboken, N. J. These experiments are to determine the efficiency of the jet as used in practice, and the most efficient new design of a practical steam air jet. The article by Mr. Lannert is concrete, practical and conservative.

American Bureau Report

In connection with the annual report of the American Bureau of Shipping, Capt. Charles A. McAllister its president said:

"The American merchant marine at the beginning of this year has a much more roseate future than it has had for the last ten years, and in fact, barring the spasmodic burst of prosperity incident to wartime conditions, it is in a healtheir state than it has been since prior to the Civil war.

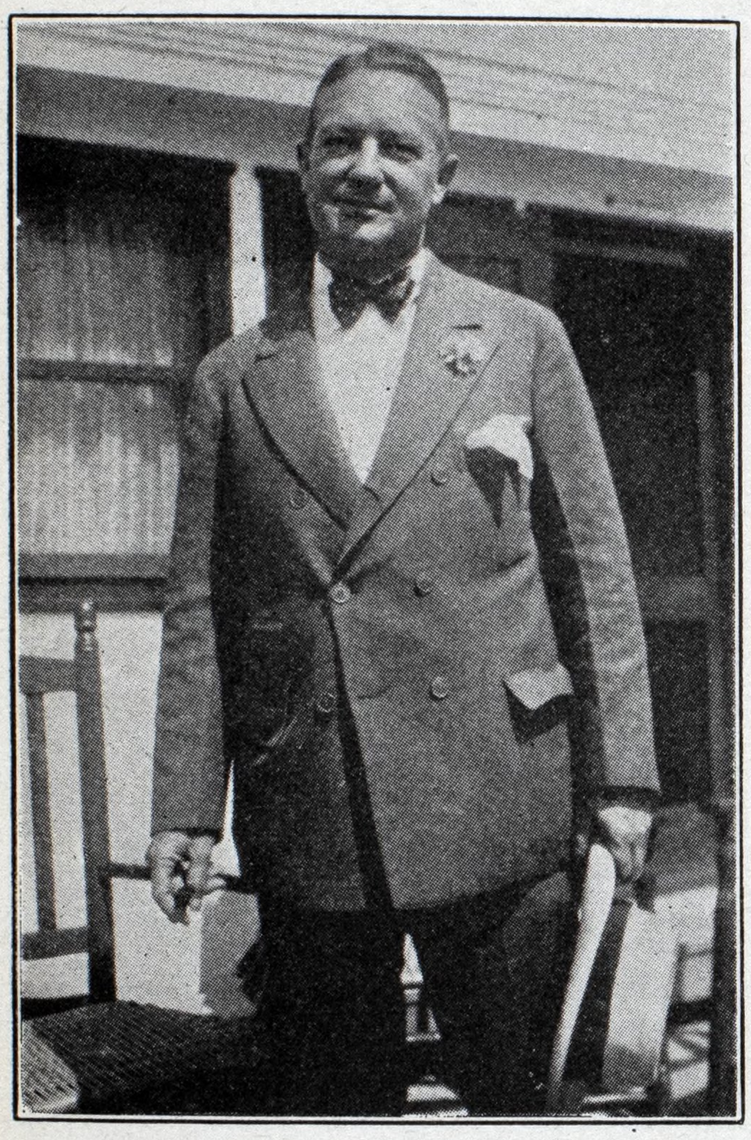
"We now have for the first time in that long period a really sound policy for future growth and permanency. So far as new construction is concerned the year 1929 will be memorable from the fact that within that twelvemonth period our shipbuilding activities jumped from a position of seventh or eighth in the world's standing in that industry to second place, and that with every prospect of retaining such a prominent place for a number of years."

The author, E. L. Lannert, is deputy smoke commissioner of Cleveland. Comments on Mr. Lannert's paper were submitted by Victor J. Azbe, consulting engineer, St. Louis, past chairman fuels division A. S. M. E.; and Samuel G. Frantz, general manager and secretary of the New York and New Jersey smoke abatement board.

Wilson and Bush Lines Combine Operations

Two well known Delaware river steamboat lines, operating between Wilmington, Del. and Philadelphia, the Wilson Line Inc. and the Bush Line have entered into an agreement to merge and combine their business. The arrangement became effective Jan. 1, and the Wilson Line Inc. with Geo. B. Junkin as president, is operating the combined lines. Henry T. Bush, president of the Bush Line becomes a director of the Wilson Line Inc.

The oldest shipping lines in Wilmington, Del. are thus united affording an interchange of service and a more expeditious handling of freight. The best facilities of each



GEORGE B. JUNKIN

line will be preserved for an improved service and the terminals of both lines will be maintained.

It is interesting to note the origin of these two lines. The Bush Line was founded in 1774 by Samuel Bush who in that year at the age of 28 purchased a 30-ton sloop which he named ANN. With this vessel he started a weekly freight service between Wilmington and Philadelphia. In the 150 years and more since this beginning the line has grown and prospered remaining in the control all these years of the founder's descendants in direct line. Henry T. Bush becoming president in 1918 was born in Wilmington, Del. in 1880.

The Wilson Line was founded by Capt. Horace Wilson in April, 1882. Operations were commenced with one boat, the WILMINGTON licensed to carry freight and 500 passengers. Since then the line has grown to eight vessels. Of this fleet three are used for excursions only and each have a capacity of 4000 passengers. Two of these the STATE OF DELAWARE and STATE OF PENNSYLVANIA were built in 1923, especially for this service, at Pusey & Jones shipyard, Wilmington, Del. The other vessels as typified by the CITY OF CAMDEN are used in regular passenger and freight service between Wilmington and Philadelphia. In addition to the vessels named others in the fleet are: BRANDYWINE; CITY OF CHESTER; CITY OF WILMINGTON; and CITY OF PHILADELPHIA. Although operating against the keenest competition the line is prospering and steadily growing.

The first of the light cruisers to be completed, the SALT LAKE CITY built at the New York Shipbuilding Co. and commissioned at Philadelphia on Dec. 11, is to proceed on her shakedown cruise to Rio de Janeiro and Bahia, Brazil, sailing from New York Feb. 1.

Trial of Motor Liner

The new motor liner CHICHIBU MARU of the Nippon Yusen Kaisha, the last of a trio of new passenger and freight liners for the company's service from San Francisco to the Orient, attained a speed of 21 knots on her trial trip of Nagasaki on Jan. 9. The new liner averaged 20.65 knots for the run and despite a high wind no vibration was evident.

The CHICHIBU MARU will make her initial voyage March and will be the second of the three new liners to enter the trans-Pacific run. The ASAMA MARU, the first to go into commission, is now maintaining exceptionally fast service. The TATSUTA MARU, which developed a speed of 22 knots during her trials will enter the service in May.

The ASAMA MARU and TATSUTA MARU are powered with Sulzer diesel engines while the CHICHIBU MARU is equipped with Burmeister & Wain diesels.

Launch Light Cruisers

The light cruiser AUGUSTA is to be launched at the Newport News Shipbuilding & Dry Dock Co. on Feb. 1. The same yard also built the light cruiser HOUSTON, launched on Sept. 7, last year. The light cruiser CHICAGO, under construction at the Mare Island, California navy yard will be launched April 10. With the launching of the CHICAGO, seven of the program of eight light cruisers authorized in 1924 will have been launched.

Retires as Manager of Marine Department

George B. Drake, who has been associated with the Texas Co. for many years, retired from the position of manager of the marine department of that company at the end of 1929. While Mr. Drake's exclusive service with the Texas Co. dates from Feb. 1, 1913, he had been indirectly associated with the company for several years prior to that date, in connection with the designing and superintendence of their marine equipment.

Prior to directly entering the company's services, Mr. Drake engaged in the profession of naval architecture with offices in Philadelphia from 1902 to 1907 and in New York from 1907 to 1913. Before that time he was con-



GEORGE B. DRAKE

nected with ship building and ship repairing with the exception of two years with the old Standard Oil organization under the late R. C. Veit.

During the World war, when the expansion of the company required a large amount of new tonnage, difficulty was encountered in placing new contracts with existing shipyards. It was then decided to establish a shipyard and the work of equipping and managing this new shipward in Bath, Me., was assigned to Mr. Drake. During the period of operation of this shipyard, four general cargo steamers, ten steam-propelled tankers, one diesel tanker, three harbor and coastwise tugs, three small diesel tankers, 14 other vessels for harbor and coastwise service were built from Mr. Drake's designs, and under his direct supervision. The building program was completed at the end of 1921.

Insulation Increases Economy

Care in Choice and Application of Insulating Materials Saves Fuel — How Losses Due to Radiation Can Be Reduced

By Lieut. C. A. Griffiths, U. S. N.

IT IS not only the boiler efficiency, nor the turbine efficiency, nor the strokes per minute being made by the feed pumps, that determines the final economy of a marine engineering installation. It is the many little heat leaks that control the final cost of the fuel. These small, indefinite, heat losses occur in the out of the way places in an engine room or fire room, and also in plain view, in front of the gage board, at the side of every oiler, fireman and engineer.

A certain amount of heat is necessary to run the plant and every pound of steam and every B.t.u. of heat lost to the atmosphere must be replaced by additional heat generated in the boilers. And that requires additional fuel. The total of all losses from many unlagged flanges and from many partly lagged valves and from many imperfectly lagged high pressure steam lines are the losses that count in determining final economy.

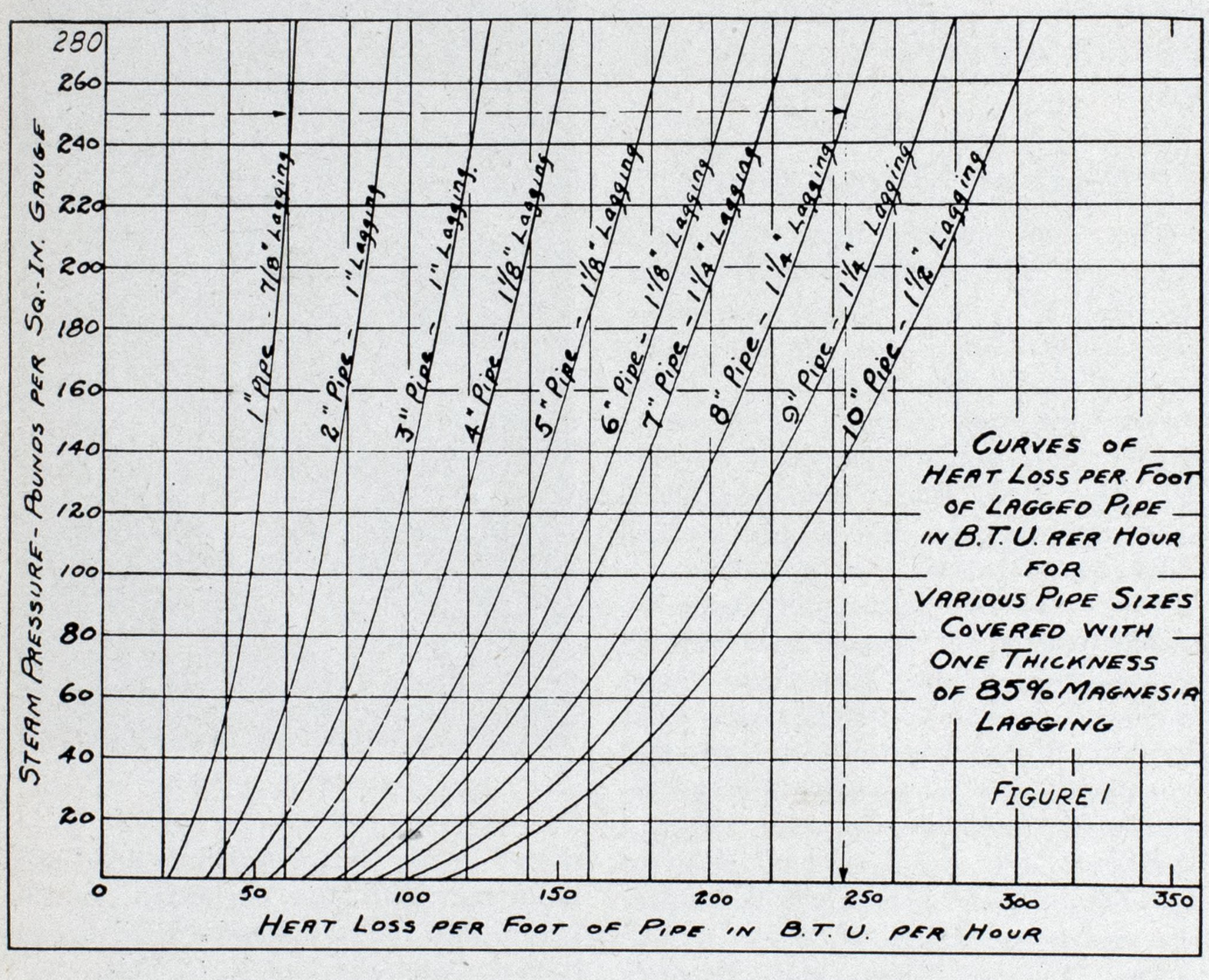


FIGURE 1

How Heat is Transmitted

The transmission of heat from a locality of a higher temperature to another of a lower temperature is accomplished by any of three means, radiation, convection or conduction. A hot body such as a furnace wall or burning gases radiates heat by a wave motion without the introduction of a solid thermal conductor in the path. A current of air brushing the furnace wall absorbs a portion of the heat of the wall by conduction from particle to particle, and then, by convection currents, it carries the heat to another, cooler, surface where it gives up its heat, this time by conduction again. This cooler surface, say a boiler tube, offers low resistance to the passage of heat and the heat received from the air currents is conducted through it to the water within. Thus, is illustrated the three forms of heat transfer; radiation from the hot wall directly to the tube, convection through the air and conduction through the metal.

Rate of the transfer of heat from the hot brick to the water within the tube varies with the different materials through which it passes. Every piece of matter has a certain heat resistance. In a boiler or condenser tube a high rate of heat transfer is required in order to get all the heat possible from one medium to the other, and the materials used must offer a low heat resistance. In a steam line, however, a low rate of heat transfer between the steam and the atmosphere is essential in order that the heat may be contained in the line, and the materials used to cover the line have high heat resistance.

Closely grained materials, such as metals, offer less resistance to the passage of heat than do loosely grained materials, such as wool or felt. These latter materials have separated cells, each of which obstructs convection currents and the conductivity between particles of the solid matter is also different in different materials due to the grain or cellular structure. Those materials offering a high resistance to the passage of heat are known as heat insulators, and it is in applying these insulators to heated surfaces that it is possible to reduce the heat leakage from them and keep the heat in pipe lines, cylinders, boilers, etc., within certain limits. There are numerous substances which by their cellular structure contain what is known as dead air cells, which are entirely enclosed, but the number of materials suitable for high temperature insulation is very limited.

Insulating Material Specifications

The limitations imposed on high temperature insulation are such that the materials must meet the following requirements:

1. It must be non-corrosive and chemically inactive. Any corrosive material might be not only dangerous to the safety of personnel through the failure of a badly corroded pipe line, but would undoubtedly result in large repair bills for replaced piping.

2. It must be non-combustible. Materials such as wool or felt are good insulators but their use on high temperature lines would soon result in charring or burning and a total loss in the heat insulating properties of the materials.

3. It must not be affected by moisture, for in any engine room there is considerable condensation in the vicinity of all lines. In order to preserve its insulating characteristics the dead cell spaces must remain intact. If the material were to absorb water the resulting mass will become more and more compact and the dead cells would become non-existant. If the material were soluble in water it would disintegrate and lose its effectiveness.

4. That the insulating character must remain unchanged at high temperatures is evident.

5. It must have sufficient strength to withstand vibration under normal

conditions. Without this strength the probable result would be uneven lagging, the material gathering in lumps at lower parts.

6. It must be easily applied.

7. It must be light in weight so as to avoid placing an unnecessary heavy load on a long pipe.

8. It must not be susceptible to excessive expansion and contraction in order that carefully made tight joints in the molded sections will not open up with fluctuations in temperature.

9. It must have a high heat resistance.

Numerous manufacturers, engineers and scientists have worked on the problem of determining the best materials for high temperature insulation, and the results have shown that for steam temperatures within the range of those used in marine service, a mixture of 85 per cent magnesia and 15 per cent asbestos gives the most satisfactory results. Other materials, such as wool, felt, or cork, have definite applications in places other than high temperature, but as high temperature insulation only is being considered these materials and their uses must be passed over. Magnesia, the principal component of heat insulation material is an inorganic matter having no chemical reaction with air or water and consists of crystalline flakes whose walls form minute dead air cells. Asbestos, the other constituent of the finished material, is a fibrous mineral matter which, in general, has a similar cellular structure. The better grades of asbestos are of the chrysotile variety which possess considerable tensile strength, elasticity, and flexibility, and is used as a binder. The two components are carefully mixed together and either molded into forms, shells, or blocks for application of different pipe sizes, or crushed into powdered form for intricate applications where moulded coverings could not be used. The mixture has high heat resisting qualities, is non-combustible, is easily applied, has a weight of approximately 15 to 20 pounds per cubic foot, and in general meets the requirements listed above for insulating material.

Method of Applying Lagging

Formed lagging is applied in either single or double thickness, depending principally on the temperature of the steam in the lines to be insulated. The curves, Fig. 1, have been prepared to show the heat lost through insulated lines of various diameters for single thicknesses only, the thicknesses being shown on the curves varying with the size of piping. Properly installed lagging will last for long periods giving efficient service with a minimum of heat loss. In the process of applying lagging it must be remembered that the object to be attained is to prevent loss of heat. Loosely applied, poorly bound or set up insulation with large cracks will defeat this purpose. Care should, therefore, be taken to insure there are no short circuiting paths for the heat to follow. Lagging loosened by vibration or other causes in the course of time is nearly as useless as no lagging at all. Continual attention to its condition is consequently an essential.

Lagging can be obtained in molded form to fit various pipe sizes, split longitudinally, and supplied with light duck covering and metal securing bands. The molded sections should be fitted to the pipe, leaving sufficient room at the pipe flanges to permit withdrawing bolts when the joint is broken, and wired in place with the ends of the wires twisted together. Ends of the sections should be butted together and a mortar, consisting of crushed material mixed with water, should be applied to fill all joints. The whole should then be covered with light canvas or, if the duck covering is furnished, it should be sewed. Molded blocks used for lagging pump cylinders, large valve bodies, etc., should be applied in the same manner, using particular care to ensure all joints being fully closed with mortar.

Lagging material of the best quality can be said to practically never wear out. Old lagging can be broken up and crushed and mixed with water to a paste like consistency, and this plastic insulation material can then be used again in successive applications, allowing each to dry before the next is applied. In this manner the thickness of the insulating wall can be built up to that desired. Care should be taken to ensure that the lagging closely fits the pipe at the ends of the sections so as to prevent the escape of heat along the pipe and out into the atmosphere and thus lost.

Definite Economy Is Gained

Joints and valve bodies should be lagged separately so that they can be broken down or removed for repairs without destroying the lagging on the rest of the line. Lagging on an uneven surface such as this is more easily applied when in a plastic condition, using a light sheet metal mold to hold it in place. The molds can then be easily removed and the material remixed when reinstalled. After pipe lines have been covered with the canvas covering it should be given a coat of preservative paint. Too much paint, however, will cause the canvas to crack, and a single coat is therefore desirable. Lagged pipe lines to deck machinery and lines in locations exposed to the weather should have additional coats of paint to protect the lagging from dampness and moisture. Extreme care should be used at all times to prevent the entrance of moisture into pipe lagging, for, compared to the insulation offered by dead air cells, water is an excellent conductor of heat, even though alone it is a poor cnductor.

The cost of lagging is small compared to the benefits received. A little money well spent in improving the plant may mean considerable saving in the course of time and the alert chief engineer neglects no op-

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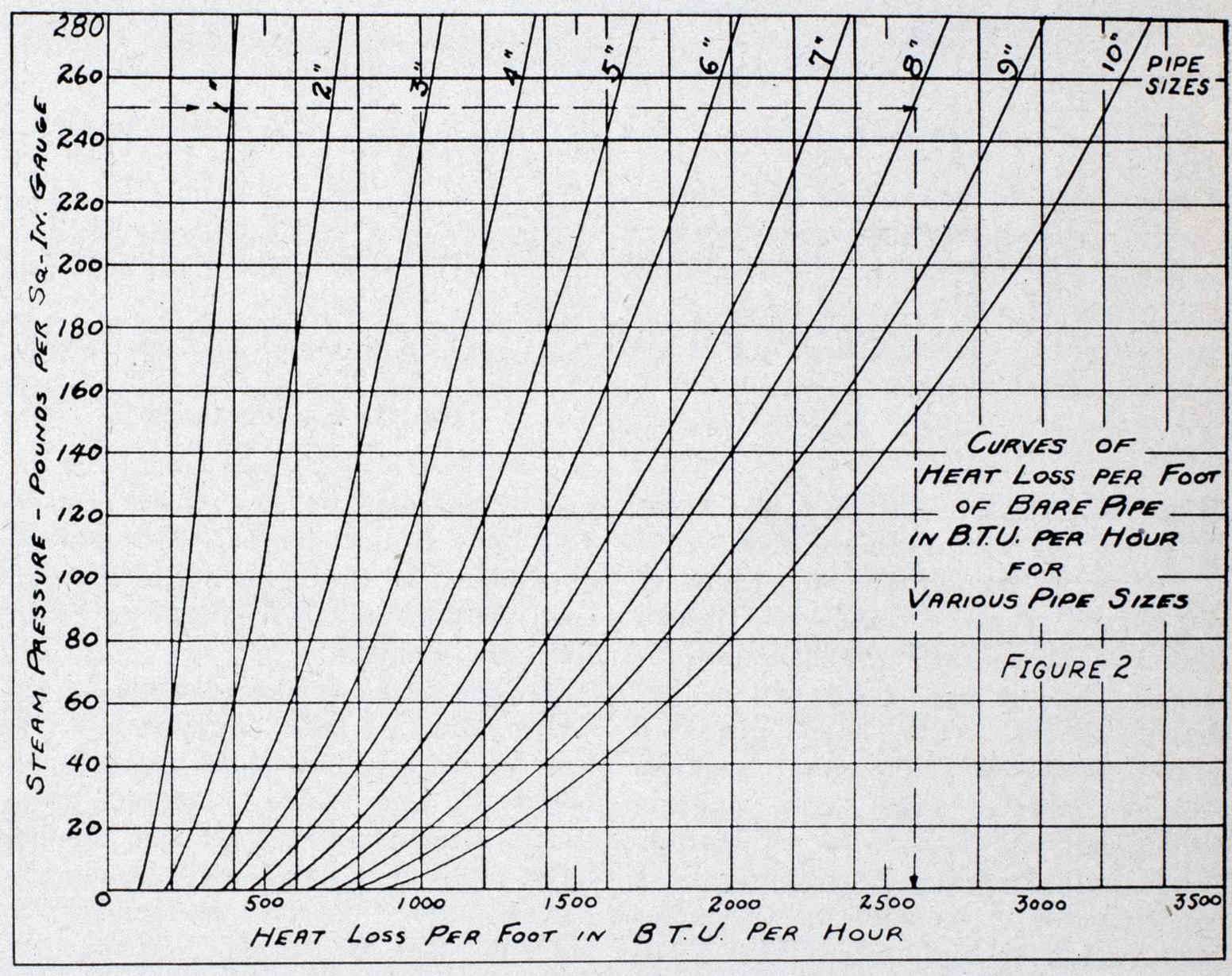


FIGURE 2

Passenger and Package Freight Lines *in* Great Lakes Transportation



Municipally Owned Dock at Chicago—Known as Navy Pier—Leased by the Goodrich Transit Co.

Improvement in Facilities and Sales Methods Needed for Steady Continuous Growth

By E. C. Powers

BEGINNING with the fur trade on the Great Lakes 300 years ago in the pirogue and canoe of the Indian, traffic on the great inland seas has grown into gigantic proportions. Out of the wake of the Indian's flimsy craft have appeared great fleets of bulk and package freight vessels which now operate throughout the season of navigation. While bulk freighters are engaged in carrying raw materials from the upper lake region to the lower lake ports, package freight vessels transport valuable finished products of the eastern and lower lake manufacturing sections to upper lake ports. There, farm produce and other perishable items are taken aboard for transportation down the lakes for consumption or for shipment overland to the eastern seaboard.

Traffic in package freight on the Great Lakes is far more important than is indicated by its tonnage over a period of years. Though the tonnage moved is a small percentage (about 3 per cent) of the total freight movement, it is approximately 17 times as great in value per ton as the bulk movement. It is estimated that the package freight trade amounts to about 36 per cent of the value of the total commerce on the Great Lakes. This fact is not generally recognized, on account of the tremendous tonnage each year in bulk movements of grain, iron ore and coal.

Vessels of American registry on the Great Lakes in 1925, engaged in package freight and passenger trades numbered 45 and totaled 149,146 gross tons. Approximately half this number have little or no passenger accommodations and operate exclusively in package freight trade. When the rates in the bulk freight movements become attractive, and there is little activity in their own trade, package freighters are placed in the bulk movements. At such times they carry coal to the upper Lakes and take on grain for the return trip.

Size of Package Freighters

Package freighters operating on the Lakes have deck hatches in addition to side ports. The vessels are much smaller than the bulk freighters. During the process of development of the bulk movement, the principle of the survival of the fittest has been at work and it is now well established that the ideal bulk freighter is the 600-footer and that vessels under 400 feet in length cannot compete at all with the larger craft. As a result a number of vessels between 250 and 400 feet in length have been taken out of the bulk trades and are now operated as package freighters or in special trades. The standard package freighters on the Lakes, not taking into account the small vessels which operate coastwise, have a gross tonnage of from 2000 to 4500 tons and a cargo carrying capacity of from 3000 to 5000 tons. They vary in length from about 250 feet to about 450 feet, in beam from 38 to 50 feet, and in depth from 24 to 30 feet.

Since the development of package freight trade is dependent upon agreeable relations between rail and lake lines, there is close co-operation with the railroads. In most cases, water terminals at the larger lake ports are owned and operated by the railroads. As a rule, use of a terminal by a lake package freight line depends on whether or not that line has an interchange business with the railroad. Generally, no charge is made for use of the facility, providing freight borne by the water carrier is consigned for movement over the lines of the particular railroad concerned. When freight is hauled by a steamship line, with the railroad bearing no part in the

transportation, the vessel is assessed for use of the terminal privilege. The customary practice is to arrange for use of the terminal on the basis of the amount of local water traffic passing over the premises. One notable exception to this condition, however, is the newly completed $1,000,000 terminal of the Cleveland & Buffalo Transit Co. at Buffalo. The new terminal was placed in operation on Aug. 5 last year, and since that time has demonstrated its practical utility, both in handling freight and expediting traffic. The terminal is served by the Delaware, Lackawanna & Western railway and the New York Central. Capacity is provided for 15 cars. This terminal is one of a few which have facilities for direct interchange between water and rail lines. Usually, the vessel line which owns or leases the terminal, has exclusive use of it; but not infrequently, other lines not in competition with the owning or leasing company, are allowed dockage space.

Only two ports on the Lakes extend terminal facilities to all vessels; these are located at Erie, Pa., and at Chicago. Certain lines, however, are permitted to lease dockage and warehouse space at Chicago. One municipal pier is under lease to one package freight line exclusively. Two boat lines are in possession of exclusive leases on the Cleveland municipal pier. One package freight line operating out of Cleveland, makes use of the facilities of a terminal owned by a railroad.

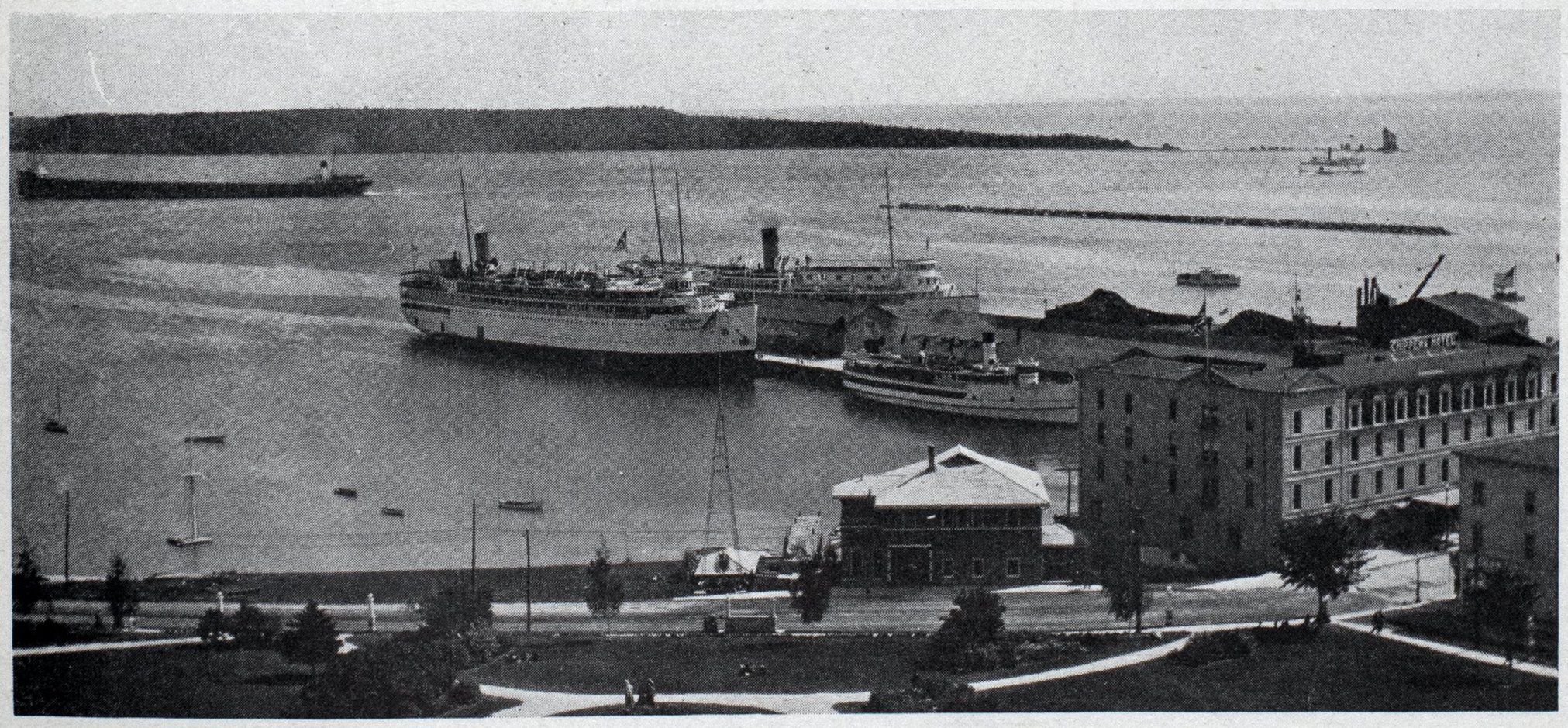
The launching of the memorable iron ship, MERCHANT in the year 1862 by J. C. Evans and his son, E. T. Evans, marked the beginning of what was destined 54 years later to become the Great Lakes Transit Corp., now the largest company on the Lakes engaged exclusively in package freight and passenger business. In operation as sister vessels of the MERCHANT were the steamers BRADBURY and SUN both up-to-date vessels according to the practice in naval architecture and marine engineering in the sixties. Until the early seventies the MERCURY was operated solely in the Buffalo, Milwaukee and Chicago line which had previously been organized by J. C. Evans. Later her service was extended in operation by the Atlantic, Duluth and Pacific Lake Co.

Seven years after the MERCHANT had gone down the ways, the steam vessel PHILADELPHIA was added to the fleet. The opening of the West and immigration of pioneers to the rich lands beyond the Lakes aided the development of Great Lakes shipping and the three combination freight and passenger ships INDIA, CHINA and JAPAN were constructed, each with accommodations for 120 passengers and a carrying capacity of 1200 tons of freight. In 1878 after 12 years of service, the MERCHANT was lost in a storm on Lake Erie.

Shipping lines on the Lakes in the early days were more or less secure in their business as the only competition was that which existed between themselves. However, a condition was fast developing which was to seriously affect their business. This condition was brought about by extension of the railroads which, in due course, carried much of the freight formerly moved by boat. This introduced the element of keen competition into the lake trade. The edge of this competition was whetted sharper by an increase in the freight movement, and still sharper by the

Water Transportation

THE importance of the passenger and package freight movement on the Great Lakes has been somewhat lost sight of in the world renown that has come to the tremendous bulk carriage of ore, coal, grain and stone. But this business is of ancient origin and has grown with the development of the country so that today it represents in value 36 per cent of the water transportation of these great inland waters. Canada's share in proportion to her wealth and population is greater than that of the United States due we believe partly to location and a keener appreciation of the needs of the business. This article however is concerned only with American activities and is presented at this time as a brief survey and compilation of records to indicate present conditions. Increased facilities in other modes of transportation such as the railroad, motor car, and airplane will serve as a stimulus to increased water transportation if the leaders of the various units comprising the great fleet of passenger and package freight vessels have the business acumen, the vision and the courage to keep pace with the times in affording better and greater facilities and in adopting effective modern methods of selling the advantages of the improved service they have to offer.—Editor's Note.



Terminal of Lake Passenger and Package Freight Steamers at Mackinac, Mich.

TABLE I

Five Year Record of Package Freight in Short Tons Moved at Major Lake Ports

Year	1924			1925			1926			1927			1928		
Port	Receipts	Shipments	Total	Receipts	Shipments	Total	Receipts	Shipments	Total	Receipts	Shipments	Total	Receipts	Shipments	Total
Buffalo	717,028	205,345	922,373	614,183	212,328	826,511	411,020	88,814	499,834	605,730	235,454	841,184	702,121	270,376	972,497
Duluth-Superior	187,062	715,379	902,441	256,209	640,073	896,282	253,381	632,066	885,447	259,490	622,386	881,876	264,745	589,918	854,663
Chicago	469,543	281,644	751,187	368,500	236,452	604,952	330,543	202,947	533,490	387,063	380,287	767,250	426,161	339,654	765,815
Detroit	132,815	74,329	207,144	160,177	77,827	238,004	171,301	56,021	227,322	181,227	62,365	243,592	193,488	66,726	260,214
Cleveland	57,665	99,885	157,550	82,852	142,784	225,636	49,343	97,573	146,916	60,153	94,380	154,533	59,289	137,690	196,979
Milwaukee	210,187	325,043	535,230	265,950	259,581	525,531	216,744	264,422	481,166	185,496	319,527	505,023	262,720	433,937	696,657
Totals	1,794,300	1,701,625	3,475,925	1,747,871	1,569,045	3,316,916	1,432,332	1,341,843	2,774,175	1,678,159	1,714,399	3,393,558	1,908,524	1,838,301	3,746,825

railroads, realizing the great economies and advantages of water transportation, establishing boat lines to accommodate the traffic consigned to destinations beyond the lake terminals of their rail lines.

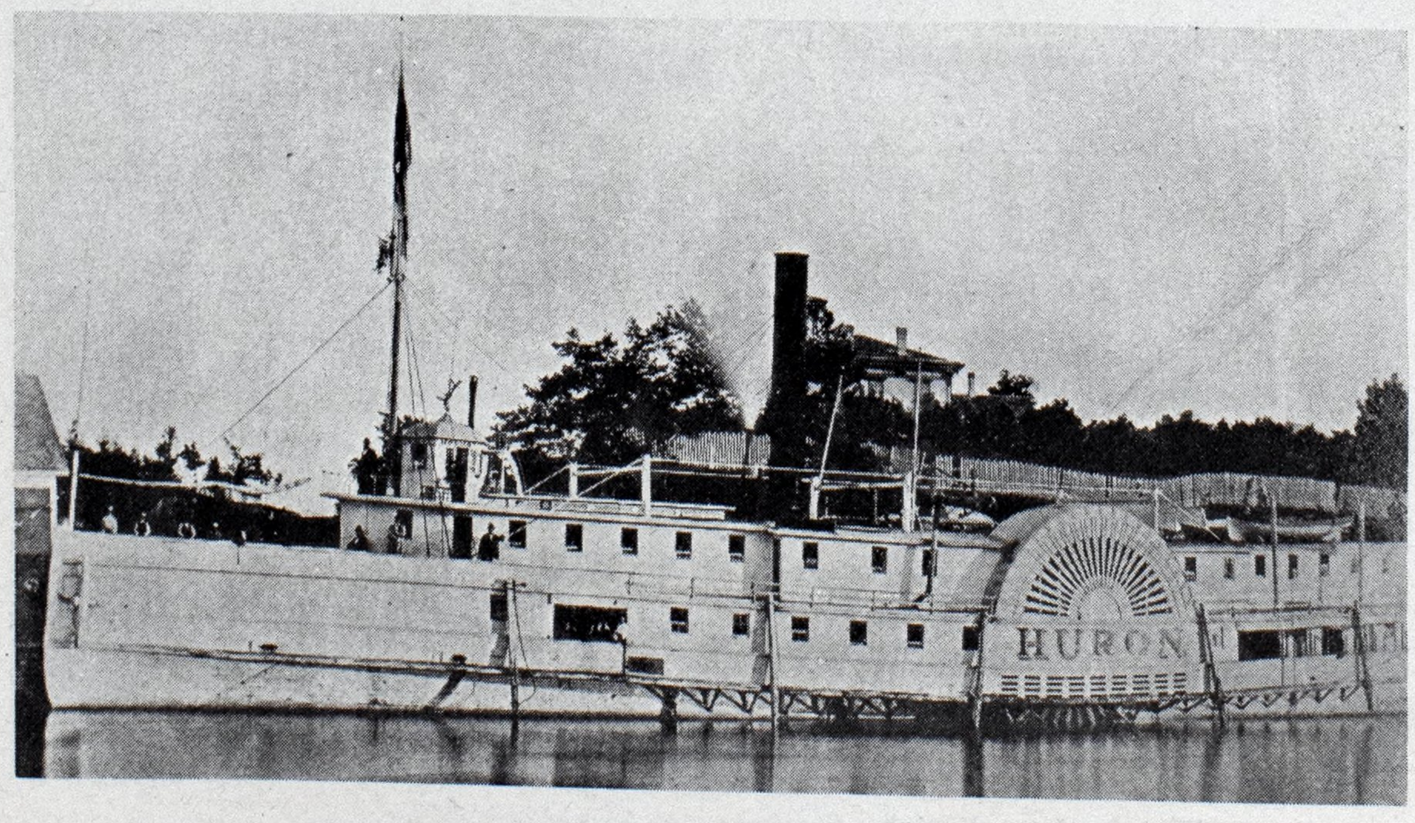
The Pennsylvania railroad in 1867 organized the Erie and Western Transportation Co., to take care of its freight and passenger traffic to and from the West. Other railroads established similar co-ordinated rail-water facilities.

The old steamers, INDIA, CHINA and JAPAN finally went into retirement after 30 years' service and were replaced by a new fleet of passenger vessels, the TIONESTA, JUNIATA, and OCTORARA. The Anchor line, originally the Erie & Western Transportation Co., and vessels of other railroads were operated on Lake Superior to build up the passenger trade while the railroads themselves were engaged in increasing their freight service. However, the activity of the railroads in operating boats on the Great Lakes finally came to an end as an offshoot of a clash between shipping and railroad interests in another section of the country.

The Panama Canal act passed by congress, Aug. 24, 1912, carried a rider which prohibited the rail lines from owning, operating, or having any interest whatever in water line property, except such as the interstate commerce commission might consider for the public good. This law finally had its effect on the Great Lakes in 1916. In itself the act of 1912 was a deliberate move to protect and build up water transportation by giving it the advantage of independence from railroad control having in mind particularly, in case of the Panama Canal, the transcontinental railroads that would be in direct and very keen competition. There was considerable conjecture as to what would become of the valuable holdings of the railroads on the Lakes. The Great Lakes Transit Corp. formed in 1916 with the late W. J. Conners chairman of the board and J. C. Evans, president, took over these properties. Capitalization of the company was set at $20,000,000. The floating property consisted of 33 ships with an aggregate tonnage of 150,000 tons. These belonged partly to the Western Transit Co., a subsidiary of the New York Central lines; the Erie and Western Transit Co., of the Pennsylvania lines; the Erie railroad; the Mutual Transit Co., which was a combination of the Erie, Lehigh Valley, New York Central and Delaware, Lackawanna & Western railroads; and the Lehigh Valley railroad.

During the World war, the new company was called upon to turn over several of its best ships to the government. The vessels chosen were cut in two, bulkheaded and taken through the Welland canal, thence through the St. Lawrence river to the Atlantic seaboard. The war had a tendency to increase traffic on the Lakes. Iron, coal, flour, and foodstuffs had to be moved quickly and in great quantities. The passenger fleet of the company, ordinarily used exclusively for passenger service, was pressed into operation and moved great cargoes of freight to Buffalo, whence it traveled by rail to the coast and thence across the ocean to the battlefields of France. With the coming of peace, the passenger and package freight vessels were returned to their respective trades and transportation on the lakes became normal once more.

The fleet of the Great Lakes Transit Corp. today is composed of 20 freighters and 3 passenger vessels. The freight vessels are operated as common carriers and do not serve any private interest as some of the bulk freighters do. The passenger vessels, even though capable of carrying freight, ordinarily do not operate in that service, being used only for carrying passengers and tourist automobiles. The average capacity of the

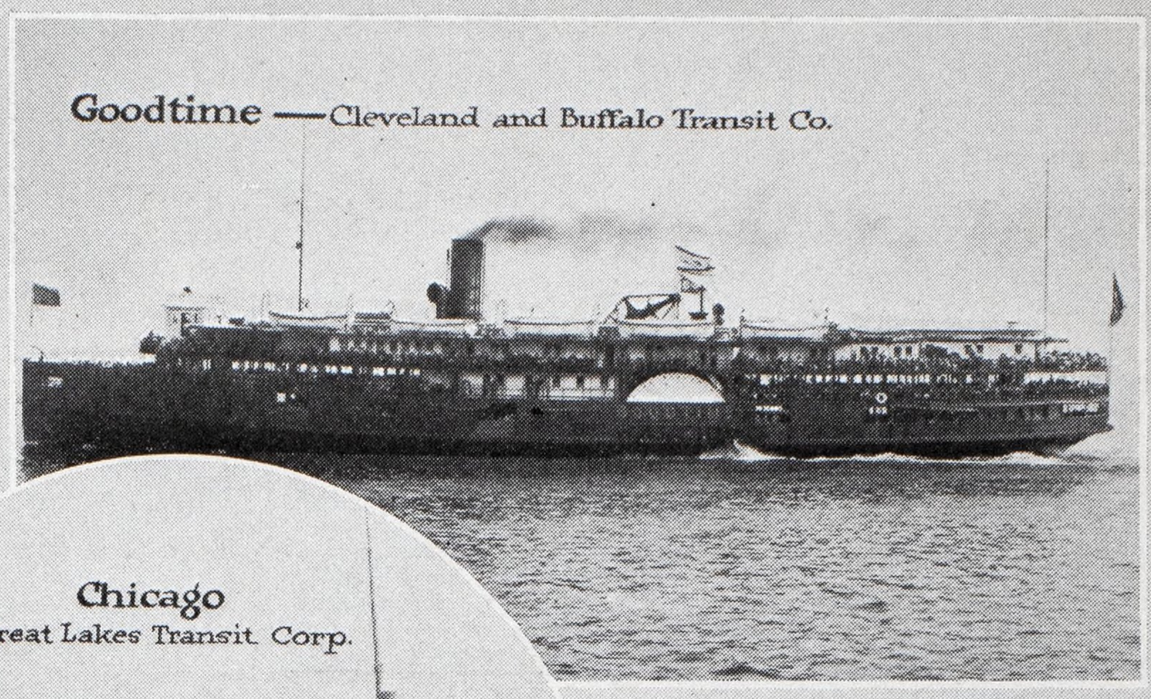


STEAMER HURON, the first steamship of the Goodrich Line. Placed in service Aug. 10, 1856. This photograph was taken at the dock, South Haven, Mich. The HURON was built at Newport, Mich. in 1852. Her captain was A. E. Goodrich who founded the Goodrich Steamship Lines, now known as the Goodrich Transit Co.

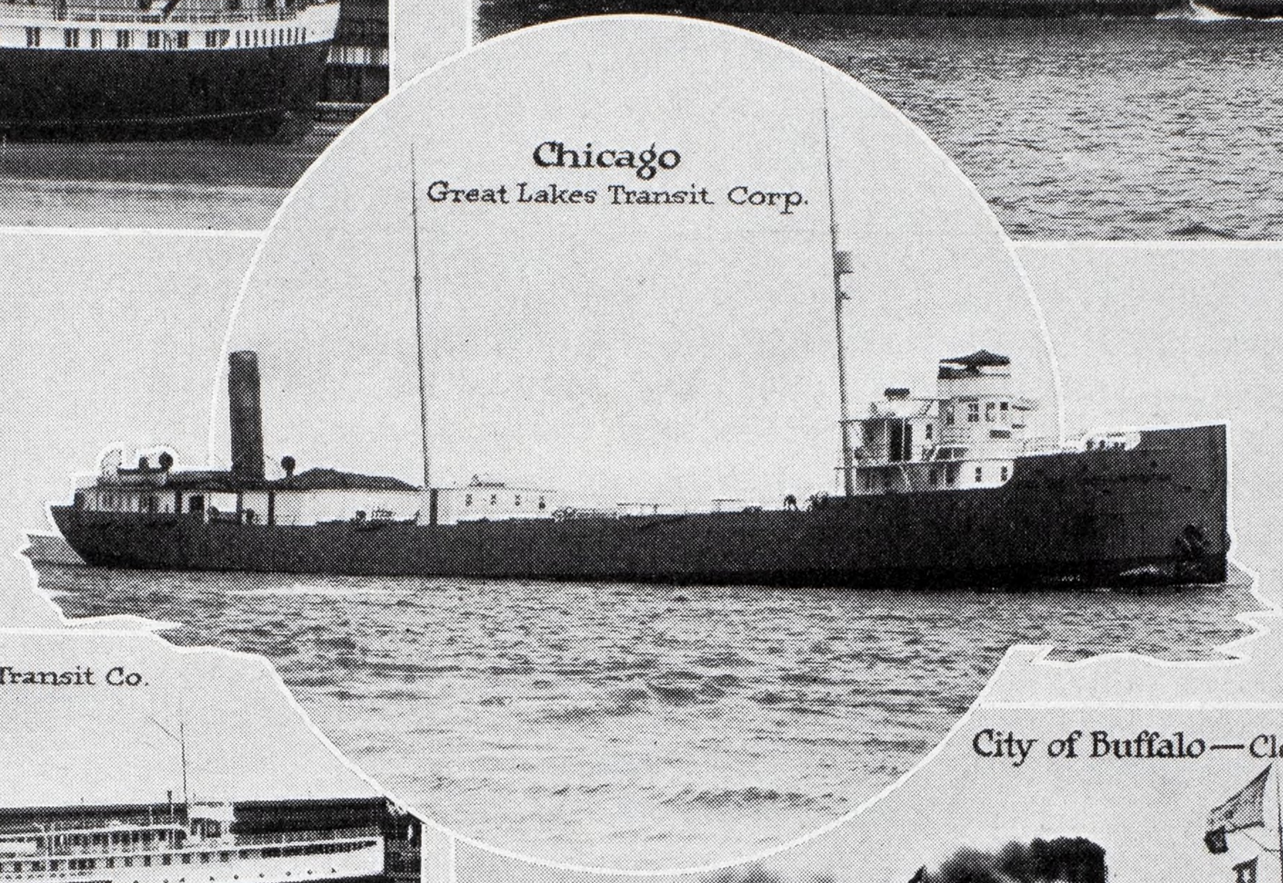
Passenger and Package Cargo Vessels



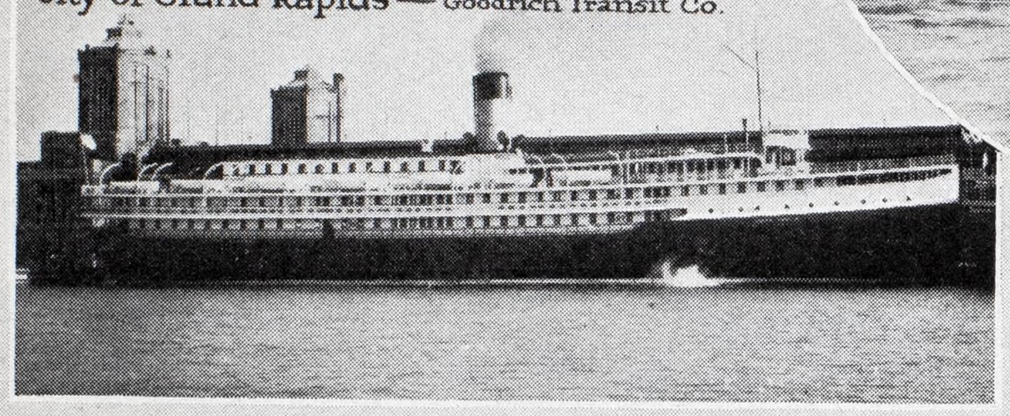
Alabama — Goodrich Transit Co.



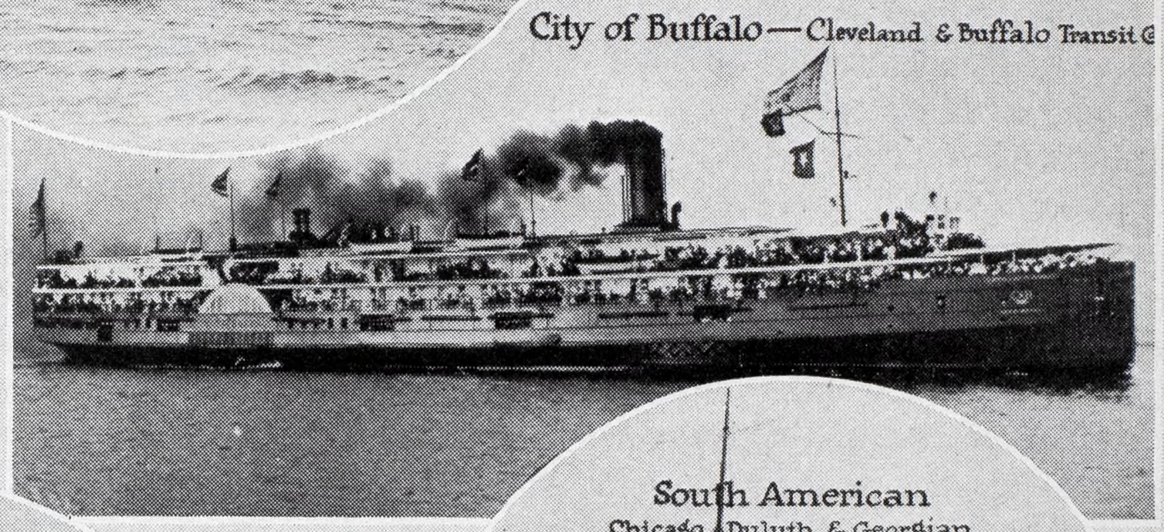
Goodtime — Cleveland and Buffalo Transit Co.



Chicago
Great Lakes Transit Corp.



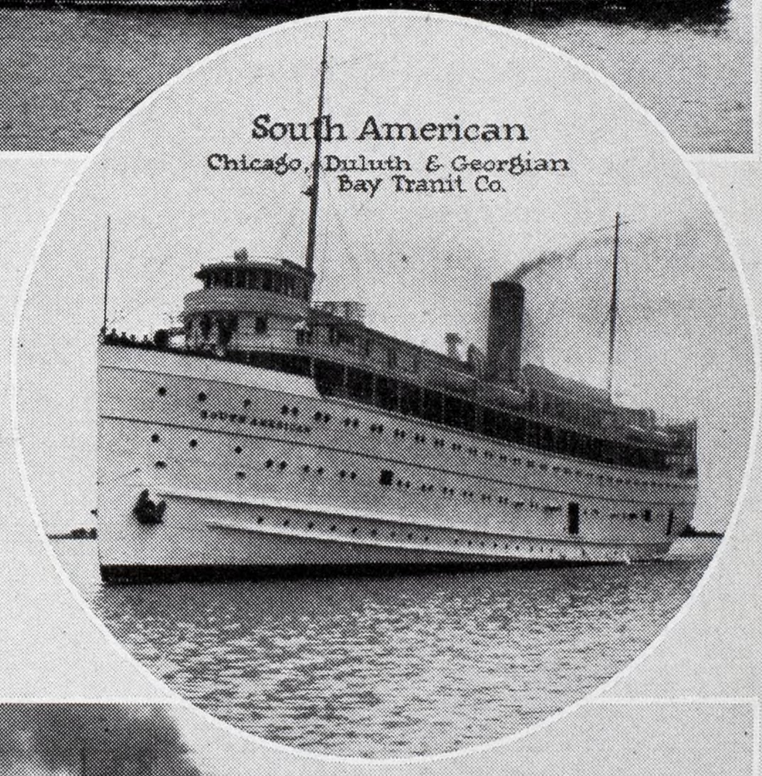
City of Grand Rapids — Goodrich Transit Co.



City of Buffalo — Cleveland & Buffalo Transit Co.



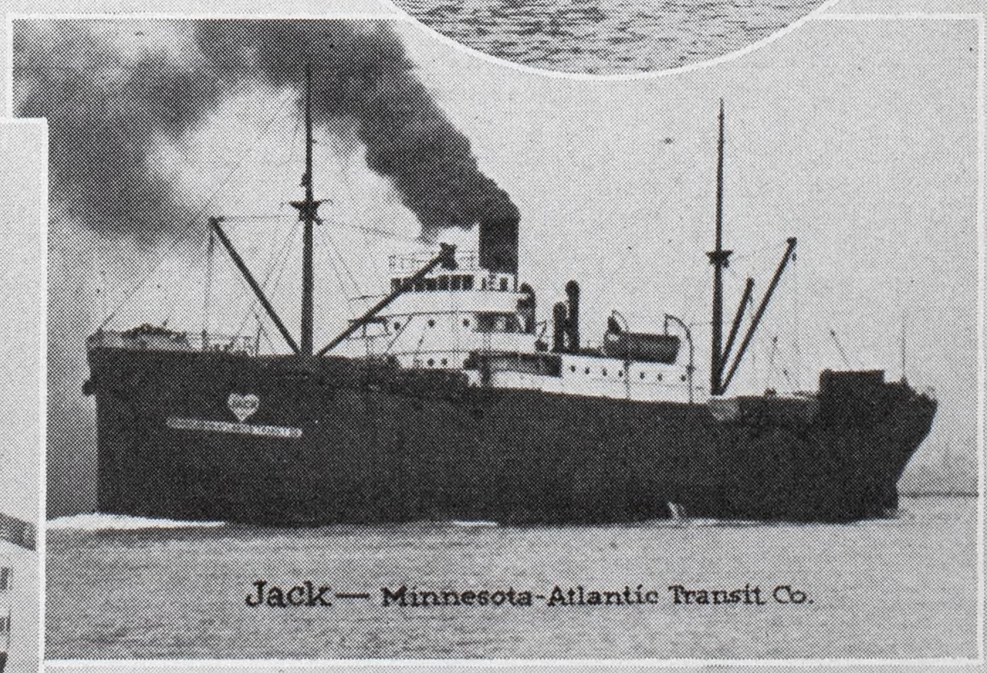
Greater Detroit — Detroit & Cleveland Navigation Co.



South American
Chicago, Duluth & Georgian Bay Tranit Co.



Missouri — Wisconsin & Michigan Line



Jack — Minnesota-Atlantic Transit Co.

TABLE II

Savings on Package Freight Shipments via Lakes

From	On Shipments to Duluth, Superior, Houghton and Hubbell, Mich. Class 1	2	3	4	5	6	7	8	On Shipments to St. Paul, Minneapolis and points taking same rates Class 1	2	3	4	5	6	7	8
Boston....	66	56	43½	29	26½	21½	47½	34½	39½	33½	27½	19	17½	15	28½	21½
New York....	same															
Phila.	66	56	43½	29	26½	21½	47½	34½	39½	33½	27½	19	17½	15	28½	21½
Baltimore	66	56	43½	29	26½	21½	48	35	39½	33½	27½	19	17½	15	29	22
Albany	77	61½	51½	37½	26	21	52	41	50½	39	35½	27½	17	14½	33	28
Rochester....	same															
Syracuse	77½	63	53	41½	25½	21½	53½	42½	51	40½	37	31½	16½	15	34½	29½
Buffalo....	same															
Erie	83½	66½	51	35½	31	24½	56½	41	57	44	35	25½	22	18	37	28
Buffalo (rail conn.)	77½	61	47½	35½	28½	22½	51½	38	51	38½	31½	25½	19½	16	32½	25
Cleveland	77½	61	45	31½	27	20	52	36	51	38½	29	21½	18	13½	32½	23
Detroit	65½	53½	39½	28	23	17½	45½	32	39	31	23½	18	14	11	26	19

Note:—Savings in cents per 100 pounds realized on shipments of various classes of package freight moved by water on the Great Lakes as given by the largest package freight shipping company on the lakes.

package freighter is about 5000 tons. Consequently, on each round trip, the fleet has a capacity of 200,000 tons of freight. Cargo is made up of grain, wool, copper, and general package freight. The capacity of each ship per season, on the basis of two and a half trips per month, or 20 per season, is about 200,000 tons.

Primarily, the service offered by the company is for shippers who have goods to be moved between Lake Erie and Lake Superior ports, and for goods destined to points beyond the lake ports.

The items which make up a cargo of the average package freighter are varied. On the westbound trip, the vessel might carry magazines, foodstuffs, tobacco, machinery, medicines, clothing, etc. After distribution of the cargo at the upper end of the lakes, the package freighter may take on a cargo of butter and eggs, other perishables, flour or grain for delivery at eastern lake ports for consumption there or for trans-shipment to some eastern center. It may carry copper from the Michigan mines, wool from Montana, or wood products, (mostly shingles), from the Northwest.

Desiring to give patrons up-to-date service, the company began early to equip its vessels with refrigerating facilities. During 1916 three vessels of the line had been fitted with such equipment and today, 15 boats of the fleet furnish an economical refrigerator service to shippers of perishable freight. Capacity of this refrigerated space is in excess of 70,000 tons per season. Refrigeration on board these vessels is designed for carrying all classes of perishable freight. In the main, however, the movement has become one of butter, eggs, dressed poultry and dairy products.

Butter, eggs, and dressed poultry, for Boston, New York and other eastern markets are collected at Duluth, from the dairy centers of Minnesota, North Dakota, South Dakota and Wisconsin. If a refrigerator vessel is not in port at Duluth at the time of the arrival of the perishable freight, the products are at once placed in refrigerators at the company's warehouse. After arrival of the ship the produce is placed aboard the vessel by electric conveyors. Cleanliness is assured at all times through the use of gloves on the part of employes while handling the perishable freight. When the ship's refrigerators are filled they are sealed, to remain unopened until arrival of the boat at Buffalo. At this port the freight is transferred to pre-cooled refrigerator cars by use of rubber tired platform trucks.

Refrigerator boxes on board the vessels are fitted with very efficient machines. Controlling devices hold the temperature at any desired degree, with recording thermometers indicating the temperature of the boxes at all times. A service which is said to be faster than all-rail shipping is maintained from the head of the lakes on virtually every working day. According to the company, delivery from Duluth to the seaboard is made in most cases on the morning of the fifth day and savings as great as 45 cents per 100 pounds are said to be realized by shippers taking advantage of the water route for movement of their goods. Free refrigeration, low freight charges, uniform temperature, careful handling and minimum time in transit, to sum up, are the many advantages which the shipper may have for the taking. Shippers of this class of perishable merchandise were at first backward about routing their products by package freight vessel on the lakes. But this trade has grown rapidly so that during the year 1927, an increase of several hundred per cent was shown. Since that time, popularity of this mode of shipment has become such that it has been found necessary for the company to enlarge the refrigerator spaces on its carriers.

Substantial Savings in Freight Charges

In Table II on this page is shown the savings realized by the shipper who freights his products by water from upper to lower lake or eastern seaboard port or from the east to western port via the Great Lakes. This table includes savings on all classes of freight.

Other important package freight lines which operate on the lakes include: The Goodrich Transit Co. which carries on an extensive business, including refrigerator service, on Lake Michigan; the Detroit & Cleveland Navigation Co., which operates a combination passenger and package freight business between Cleveland and Detroit and Detroit and Buffalo; the Cleveland & Buffalo Transit Co., which conducts a similar service between Buffalo and Cleveland; the Arnold Transit Co., which hauls passenger and package freight on Lake Michigan; the Chicago, Duluth & Georgian Bay Transit Co., which operates in the excursion trade between upper and lower lake ports



Municipally Owned Terminal of the Cleveland & Buffalo Transit Co. at Cleveland

in mid-summer; the Minnesota-Atlantic Transit Co., which operates five freighters between Duluth, Detroit and Buffalo; Goodrich-West Ports Co. line, operating on Lake Michigan; the Wisconsin & Michigan Transit Co., and Hill White Transit Co., both on Lake Michigan; the Ashley & Dustin line and the Red Star Navigation Co., both on Lake Erie. Other small lines operate coastwise in port to port passenger or package freight runs. In Table IV on page 44 will be found interesting figures on 12 of the active package freight lines on the lakes.

There has been a steady increase in the annual tonnage hauled in package freight vessels on the lakes. The amount of this increase may be noted in Table I on page 40.

In recent years there have been instances of shipping companies in the package freight trade on the lakes going out of business, or of lines being taken over by other interests. In regard to the lines on Lake Michigan, the Hill Steamboat line in 1924 discontinued operations between Chicago, Milwaukee, Sheboygan, Waukegan, Kenosha, Manitowoc, Kewaunee and Sturgeon Bay. The vessels and the routes of the Hill company were taken over in October of that year by the West Ports Steamship line which has maintained the services since. In March, 1925, services of the Crosby Transportation Co. were terminated. The Wisconsin & Michigan Transportation Co. was organized and acquired the vessels and the route of the former concern. Operations have been carried on since that time. In the autumn of 1926, the Chicago & South Haven Steamship Co. ceased operations. The holdings of this company were taken over in the spring of 1927 by the Chicago, Benton Harbor & South Haven Transit Co. The service of the former Benton Transit Co. was acquired by the company at the same time. During 1927 and 1928, this company operated between Chicago, South Haven, St. Joseph, and Benton Harbor. In the fall of 1928 these services were brought to a close.

About three years ago the Goodrich Transit Co., largest package freight company on Lake Michigan, bought the equipment of the Chicago, Racine & Milwaukee line. After absorption of this line by the Goodrich Transit Co., the Milwaukee Steamship Co. was organized to operate between Milwaukee and Chicago in an attempt to succeed to the route of the former company. Operations, however, were unsuccessful and the Hill Steamboat line extended its services to include Milwaukee and other points. In recent years, the Goodrich Transit Co. also took over the holdings of the Graham & Morton Transportation Co. and the West Ports Steamship Co.



Steamer Jack of Minnesota Atlantic Transit Co. Loading Through Side Ports

Efficient Cargo Handling Methods

Until recently, the old fashioned hand method of trucking was used at practically all ports in the package freight trade. During the four months of the year in which the package freighters do not operate, the habit of shipping by rail is formed and the tendency is to continue shipping by rail during the season of navigation. This had a tendency in the past to retard development of the package trade and resulted in a backward attitude toward modern improvements in stevedoring. The amount of time saved by the vessels in loading and unloading by mechanical handling equipment might easily result in extra trips per season, thereby increasing the earning power of the vessels and the capacity of the fleets. By the hand method of unloading, 400 tons per hour is probably the maximum amount of cargo that can be handled. The time the vessel is in port in excess of that required with mechanical equipment is a time when the vessel is losing money. A more general adoption of modern mechanical handling equipment will result in much greater economy and would tend undoubtedly to increase the movement of package freight on the Great Lakes. At a few ports a start has been made in the installation of modern equipment for freight handling in this trade.

Perhaps the most modern type of package freight terminal on the lakes is the McDougall terminal at Duluth. The pier of this terminal offers 900 feet of berthing space and has a warehouse of 140 feet in width and four stories high. A six-story cold storage plant adjoins the warehouse. The terminal has rail connections with railroads entering Duluth. An overhead viaduct 550 feet in length and 32 feet wide for use of trucks reaches the terminal at a level with the third story and extends along the warehouse and the cold storage plant. A length of the pier deck, ten feet wide, extends between the buildings and the face of the pier along the whole length of the pier. This length of pier is equipped with inclined gangways for facilitating freight movements in and out of vessels which have side ports.

A number of elevators expedite the movement of freight between the four floors of the warehouse and the cold storage plant. Electric tractors and trailer trucks are employed for the movement of freight on one level. Two five-ton cranes which operate on a 30-foot radius serve the warehouse and ship. Package freight is loaded into the ship's hold by a conveyor of the spiral type.

TABLE III

Passenger Movement on the Great Lakes

Year	Number
1923	23,076,974
1924	23,104,442
1925	25,643,576
1926	28,123,747
1927	27,161,024
1928	24,104,992

Note:—Number of passengers carried on vessels of the Great Lakes each year from 1923 to 1928 both inclusive.

Ten separate cold storage units comprise the cold storage plant which provides 1,000,000 cubic feet of refrigerating space with temperatures for any service required, whether it be cool or very cold. Various perishable commodities including butter, eggs, cheese, fruits and dressed poultry, are received in the storage from refrigerator cars for safe keeping or for shipment by lake vessel.

The advantage of up-to-date equipment in expediting the movement of vessels in the package freight trade is obvious. It is also of great value to shippers since by directly increasing economy by decreasing the vessel's time in port, it serves to lower freight rates. It is certain that a wider development of the mechanical handling equipment as concerns the package trade on the Great Lakes would result in an increase in traffic and greater profit to the lines.

One of the most modern package freight movements, and one which is symbolic of the faith which operators have in the future of this trade on the Great Lakes, is the service of the Central West-European Transport Co., Detroit, which through the past season operated four vessels in a regular fortnightly service carrying package freight from Detroit and Cleveland to foreign ports, including London, Hamburg, Antwerp, Rotterdam and others. A service such as the one this company offers has been widely discussed in the past but it remained for the above company to actually get into operation. The vessels operated were the DEWSTONE, BOREAS, MAGNAR, and ELFSTONE. The DEWSTONE is a twin screw steam vessel 235 feet 1 inch long, 36 feet 1 inch beam, 15 feet 3 inches draft. She was built in 1924 by Swan, Hunter & Wigham Richardson. The BOREAS, built in 1921 by Sir John Priestman & Co., Sunderland, is a single screw steam vessel 245 feet 1 inch long, 37 feet beam, and of 16 feet 2 inches draft. The MAGNAR is a single screw steam vessel, built in Sweden in 1900, and is 230 feet 3 inches long, 34 feet beam, and 13 feet 4 inches deep. The fourth vessel of the fleet, the ELFSTONE, was built in 1924 by Swan, Hunter & Wigham Richardson, and is a single screw steamship, 235 feet 1 inch long, 36 feet 1 inch beam, and 15 feet 3 inches deep. These vessels are under lease to the operating company.

The Central West-European Transport Co., a responsible and dependable organization, which established a regular service between Detroit and Cleveland and European ports by way of the Welland canal and St. Lawrence river, was formed in anticipation of a growing freight movement direct from Great Lakes ports to foreign destination following completion of the new Welland canal. The company intends to continue in this trade during the coming season with a regular service.

Cargoes between American Great Lakes and European ports would be made up of such items as iron and steel, machinery, paint, nails, nuts and bolts, wire, oil barrels, in short, practically all of the various items to be found in the hold of the average Great Lakes package freighter. The schedule time from Cleveland to ports of destination is from 17 to 19 days.

Advantages to the shipper and exporter are claimed by the company for its Great Lakes-foreign-ports package freight service. These are: 1. Lower freight rates; 2. no transfers or lighterage such as that which now exists at Atlantic ports. This insures arrival at ports of destination in as good condition as when shipped; 3. saving of claims; 4. cargo is received and loaded on ship up to date of sailing; 5. immediate delivery to shippers of bills of lading when cargo is aboard; 6. insurance to be as low as that allowed vessels rated A-1 by Lloyds.

In the passenger trade on the Lakes, several of the prominent lines offer pleasant excursions and travel experiences. These are conducted in addition to the regular port to port passenger business of the lines. The special excursions and cruises conducted by them are well patronized and there has even been a gain in number of travelers from year to year.

One such cruise is that which is offered by the Great Lakes Transit Corp. in its three passenger vessels, the TIONESTA, the JUNIATA, and the OCTORARA, between Buffalo and Duluth. The cruise covers approximately 2200 miles. The excursionist may go aboard the vessel at any port of call along the route. Beginning at Buffalo the course of the vessel is over Lake Erie, to Cleveland

TABLE IV

Particulars of Package Freight and Passenger Lines on the Great Lakes

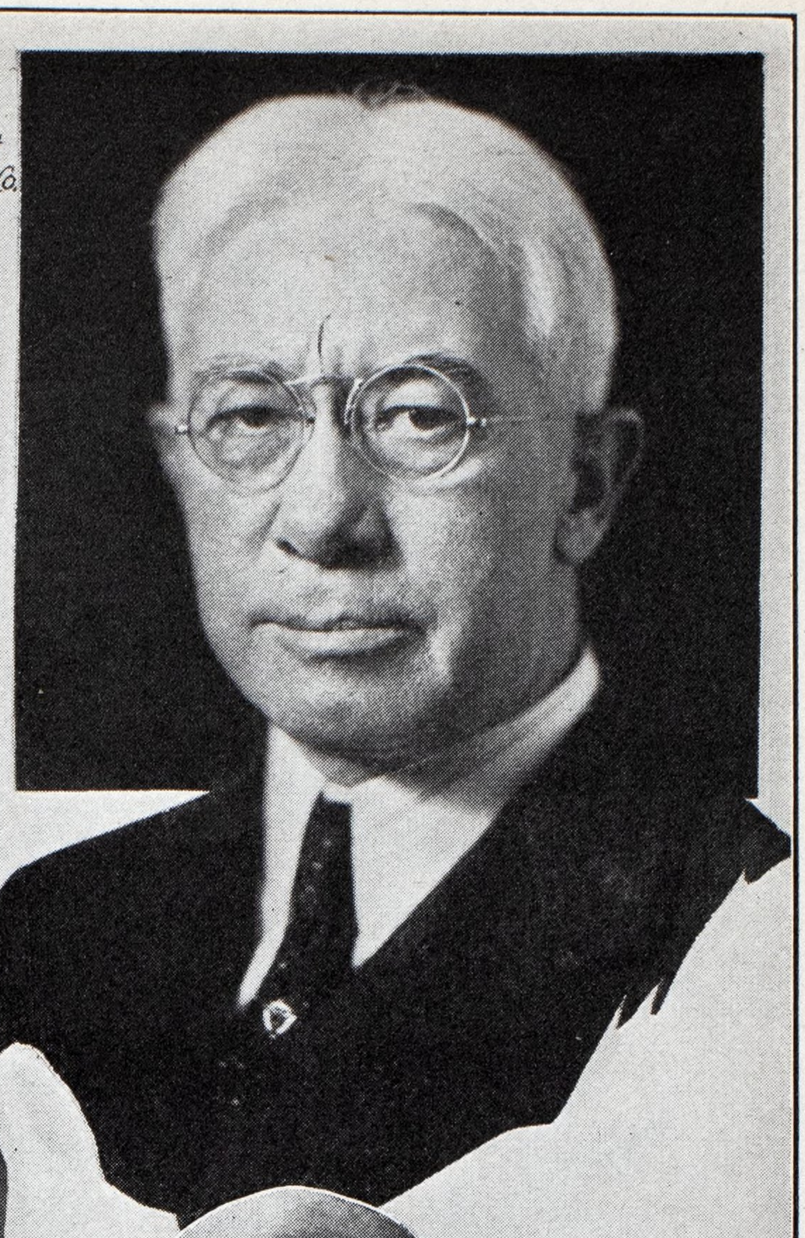
Company's Name	Established	Boats Then	Type	Ports Served Originally	Boats Added	Boats Now	Ports Served Now	Cargo or Passengers Per Trip
Great Lakes Transit Corp.	1916	35	3 Passenger 32 Freight	Buffalo, Erie, Cleveland, Detroit, Duluth, Houghton, Hancock, Lake Linden, Sault Ste. Marie, Chicago, Milwaukee	None	23	Same as originally	200,000 tons freight moved by fleet per trip 500 passengers on pass. boats.
Goodrich Transit Co.	1856	1	Passenger Freight	Lake Superior ports including Chicago, Milwaukee & Green Bay	69	14	Principal ports of Mich. & Wisconsin, also Michigan City, Michigan	170 tons freight 489,532 passengers (1928)
Detroit & Cleveland Nav. Co.	1852	3	Passenger Freight	Detroit, Cleveland	6	6	Same as originally, except Mackinac Island and St. Ignace	Passengers (Variable) 400 tons (estimated)
Minn.-Atlantic Transit Co.	1923	4	Freight	Duluth-Port Huron	1	5	Same as originally and Detroit and Buffalo	3100 tons per vessel
Cleveland-Buffalo Transit Co.	1892	2	Passenger Freight	Cleveland, Buffalo	2	4	Same as originally, and Port Stanley, Cedar Pt., Put-in-Bay	500 tons cargo per trip Passengers (variable)
Wisconsin & Mich. Transit Co.	1925	3	2 Passenger 1 Freight	Milwaukee, Grand Haven, Muskegon	1	4	Same as originally	Passengers (variable) 45-70 automobiles
Arnold Transit Co.	1887	1	Freight	Mackinac Island to Escanaba and Manistee, Mich.	11	3	Same as originally and Sheboygan, St. Ignace, Hessel, Cedarville, Mich.	Passengers 15 per trip av. Freight (variable)
Goodrich-West Ports S. S. Co. (Formerly West Ports Steamship Co.)	1924	3	Freight	Chicago, Kenosha, Milwaukee, Sheboygan, Manitowoc	None	3	Same as originally and Kewaunee, Sturgeon Bay, Sawyer, Two Rivers, Mich.	1000-1500 tons per vessel (est.)
Chicago-Duluth & Georgian Bay Transit Co.	1912	2	Passenger	Chicago, Buffalo and ports between	None	2	Same as originally	500 passengers per trip
Hill White Transit Co.	1925	1	Freight	Green Bay and Washington Island	None	1	Green Bay & Escanaba	200 tons freight per trip
Red Star Navigation Co.	1925	1	Passenger	Toledo and Cedar Point	None	1	Toledo and Cedar Point	1000 Passengers per trip
Ashley & Dustin Line	1860	1	Passenger	Detroit, Put-in-Bay and Sandusky	None	1	Same as Originally	100 tons per trip (est.)

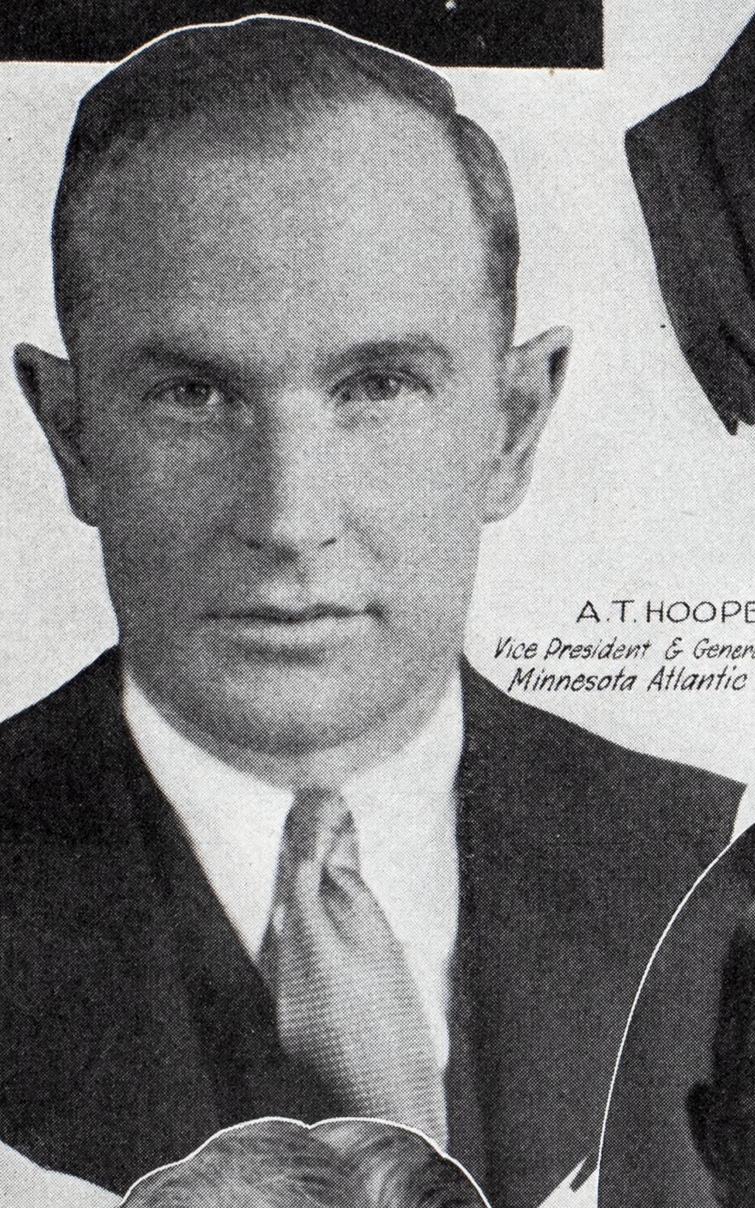


A. A. SCHANTZ
President, Detroit and Cleveland Navigation Co.

C. L. PERKINS
General Manager, Detroit and Cleveland Navigation Co.







A. T. HOOPES
Vice President & General Manager, Minnesota Atlantic Transit Co.

A. MILLER McDOUGALL
President, Minnesota Atlantic Transit Co.

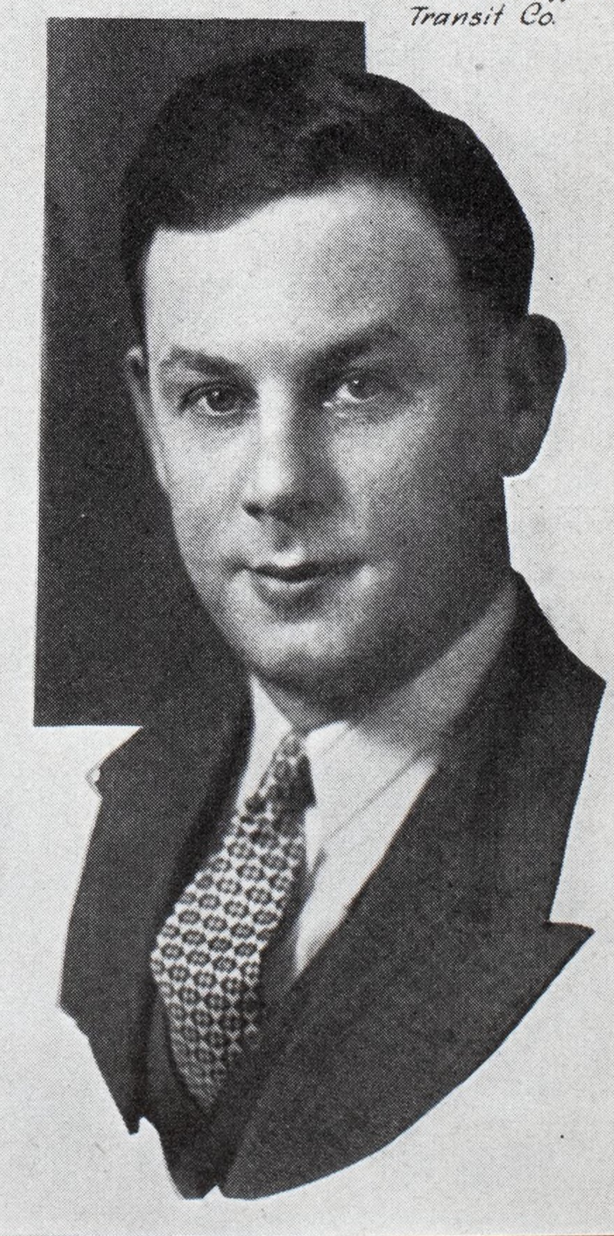


GEO. A. TOMLINSON
President, Cleveland and Buffalo Transit Co.



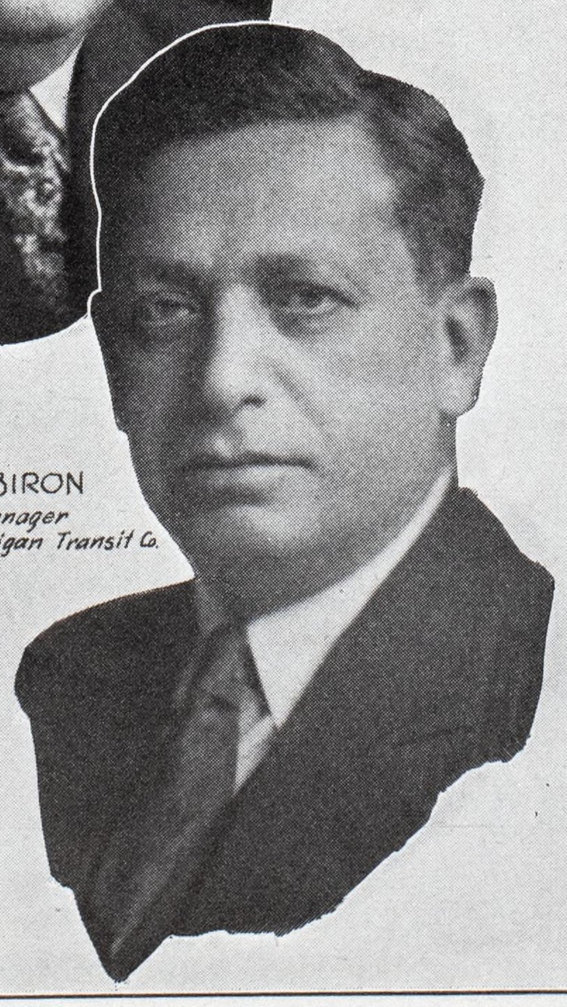
CAPT. EDWARD E. TAYLOR
President and General Mgr., Goodrich Transit Co.

P. J. SWARTZ
General Manager, Cleveland & Buffalo Transit Co.





LOUIS N. BIRON
General Manager Wisconsin & Michigan Transit Co.



GEO. A. BOMM
General Agent at Buffalo, Cleveland & Buffalo Transit Co.

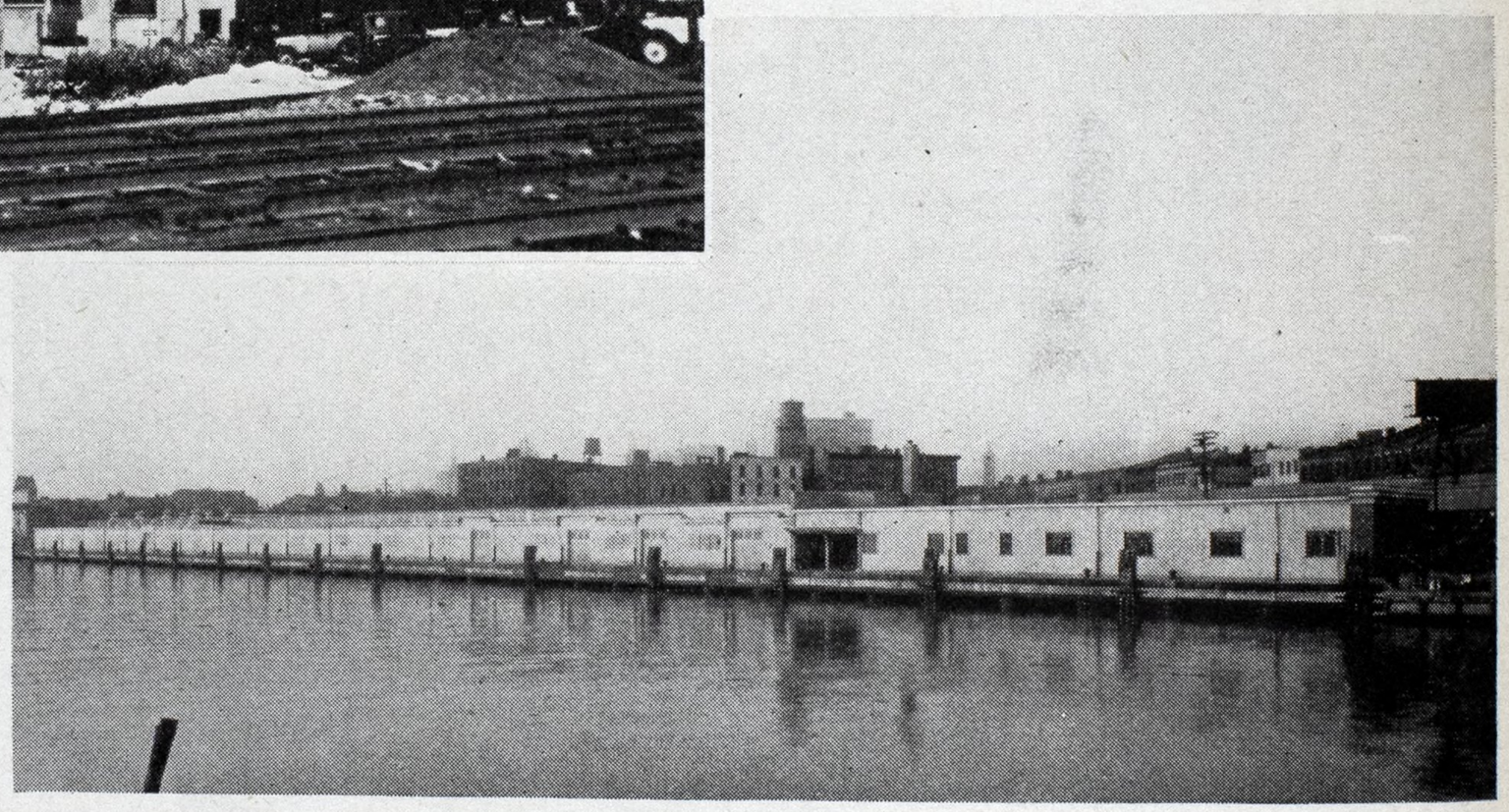
where a stop-over is arranged in order that passengers may see something of the city. Leaving Cleveland, the boat proceeds to Detroit. On the second day the boat passes through the St. Clair flats into Lake St. Clair, thence through the St. Clair river into Lake Huron. Early the third day, the vessel reaches Mackinac Island where the traveler may visit Fort Mackinac and other historical spots. On the morning of the fourth day, the vessel arrives at Duluth, the destination at the upper end of the Lakes. In addition to this cruise, the company maintains three sailings per week between Buffalo, Cleveland, Detroit, Mackinac Island, Sault Ste. Marie, Houghton, Mich., and Duluth.

Another of the great travel experiences offered on the Great Lakes by the passenger lines is that of the Chicago, Duluth & Georgian Bay Transit Co. This line which was established in 1912, operates two oil burning steel vessels, the NORTH AMERICAN and SOUTH AMERICAN, in a week's cruise which extends between Chicago, Mackinac Island, Parry Sound, Ont., Detroit, Cleveland and Buffalo. Sailings are maintained twice weekly and accommodations are provided for 500 passengers.

Leaving Chicago, the boat sets out for Mackinac Island where a stop is made. On the second day, the cruise enters Georgian bay and arrives at Parry Sound. The third day finds the vessel entering the St. Clair river and nearing Detroit where another stop is made. Leaving Detroit, the vessel passes Cleveland and on the morning of the fourth day reaches Buffalo, from which point a visit is made to Niagara Falls. The remainder of the week is used in making the return trip from Buffalo to Mackinac Island. This cruise is conducted by the company for ten weeks during the middle of the summer season. Besides this seven-day excursion, the company conducts regular sailings between the major ports on the Great Lakes, between Chicago and Buffalo. Various other passenger lines offer excursion opportunities during the summer months, in fact, practically all of them do so. The two described above are typical examples. Table IV shows passengers carried on the Great Lakes for the past six years. In excursion travel, of the kind conducted by the Great Lakes Transit Corp. and the Chicago, Duluth & Georgian Bay Transit Co., there has been a marked gain.



Terminal at Buffalo of the Minnesota-Atlantic Transit Co.



Terminal at Buffalo of the Detroit & Cleveland Navigation Co.

Many Regular Passenger Services

During the navigation season on the Lakes, approximately 25 passenger lines, not including companies operating day excursion boats and passenger ferries, maintain regular schedules between major lake ports. In the great majority of cases, operation is carried on during the season of navigation only. In a few instances, services are maintained throughout the year. The most notable example of the latter is the Pere Marquette line steamers' service across Lake Michigan the year round. Steamers regularly engaged in the passenger trade carry small cargoes of package freight and in some instances mail is carried also. This is true where the water route is the only means of transportation.

A very considerable passenger traffic is carried on in overnight service between Buffalo, Cleveland, and Detroit. Some of the vessels operated in schedules between the above mentioned ports are of exceptionally large size and very luxuriously furnished. In this regard, attention is called particularly to the SEEANDBEE, operated by the Cleveland & Buffalo Transit Co. in an overnight service between Cleveland and Buffalo and the GREATER DETROIT and GREATER BUFFALO, of the Detroit & Cleveland Navigation Co. in a similar service between Detroit and Cleveland.

Two new passenger vessels of the Detroit & Cleveland Navigation Co., the GREATER DETROIT and the GREATER BUFFALO, which were put into service in 1924, are of the side wheel type, 550 feet overall, 58 feet beam, 100 feet over guards, with a speed of approximately 21 miles per hour. These vessels are fitted with rudders at bow and stern for easy handling in narrow waterways. They are built of steel and have sleeping accommodations for 1200 passengers. They are said to be the largest passenger vessels in the world on fresh water.

The SEEANDBEE of the Cleveland & Buffalo Transit Co. is somewhat smaller than the two carriers described above, being 500 feet overall, 58 feet beam, 23 feet 6 inches molded depth, and of the side wheel type, constructed of steel.

In addition to the passenger services rendered by the Detroit & Cleveland Navigation Co., and the Cleveland & Buffalo Transit Co., through services for passengers, either over their own lines or through connections with others, is offered by the Chicago, Duluth & Georgian Bay Transit Co., the Goodrich Transit

Co., the Detroit & Windsor Ferry Co., Pere Marquette line steamers, the Buffalo & Crystal Beach Corp., the Great Lakes Transit Corp. and others.

It is practically inevitable that there will be a great increase in package freight traffic on the Great Lakes in the future. This is certain because under the stress of inadequate facilities on the part of railroads to handle a too-rapidly growing freight movement, all possible transportation systems will, of necessity, have to be developed. The crowded condition of some of the important railroad terminals and the consequent delay to through shipments will cause the wider use of water shipments on the Great Lakes.

The adoption and installation of modern mechanical stevedoring equipment at the important Great Lakes ports will make water shipments more attractive to shippers. However, the fact which is bound to have most effect in the development of the package freight trade is that through the years, rail freight rates have shown a steady increase, while water rates have varied but little. Sooner or later, the shipper who has the privilege of shipping his products by vessel on the Great Lakes will see in water shipment one of the greatest economic factors in his business and will make use of it.

The North German Lloyd superliner EUROPA, sister ship of the BREMEN, recently docked at the yard of Blohm & Voss, Hamburg, for bottom painting and fitting of propellers, is scheduled to leave Hamburg Feb. 4 for engine trials and completion at Cuxhaven and will sail March 19 on her maiden voyage to New York.

The California Clipper

The appropriate caption "California Clipper" is given to the reproduction of a fine clipper ship painting in colors by Frank Vining Smith. It is used on the new Pymouth Cordage Co.'s ship calendar.

The painting represents the famous clipper ship YOUNG AMERICA built at the yard of William H. Webb at New York in 1853. She was a large and heavily sparred vessel, built for speed and carrying capacity and was known as an "extreme" clipper ship. She was 243 feet long on deck and she was so staunchly constructed that she lasted throughout 30 years of hard service. A record which still stands of 99 days from Liverpool to San Francisco was made by this ship. Her average passage from New York to San Francisco was 108 days. During her career the YOUNG AMERICA was a lucky ship and free from serious mishaps. Under her original rig she carried a crew of 75 men and swung a 104-foot main yard.



Main Dining Room, Steamer Missouri of the Wisconsin & Michigan Line

---

After 50 years through varied fortunes and in altered guises, the veteran clipper, FALLS OF CLYDE, the sides and framework of which are of honest wrought iron, is said to be as sound and seaworthy today as when launched at Glasgow.

Becomes President

John Alsop has been elected president of the shipping firm Sanderson & Son, Inc., representing the Lamport & Holt, Royal Mail and the Pacific Steam Navigation lines in the United States. He will be in charge of the company's headquarters in New York beginning Feb. 1. He succeeds David A. Cook, who as vice president of the firm was in charge in the United States. Mr. Alsop succeeds Lord Kylsant as president of Sanderson & Son. The control of the company, however, still remains with the latter as it is a subsidiary of the Royal Mail and associated companies.

The well known firm of Henry J. Gielow, Inc., naval architects and famous designers of elaborate yachts has elected Admiral Henry A. Wiley, U.S.N. retired, vice president. Admiral Wiley retired from active duty in the navy last Sept. 30. During his service in the navy he rose to the high post of commander-in-chief of the United States fleet.



Steamers Seeandbee and Goodtime of the Cleveland & Buffalo Transit Co. at the Cleveland Terminal at Height of Season

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

WHERE a bill of lading issued by a vessel's agents to a shipper provided that "all other conditions and exceptions" should be as per charter party, the deviation clause in the charter party fixed the rights of the parties, rather than the deviation clause of the bill of lading, though the stamp in the margin of the bill of lading stated that all clauses and conditions of a certain bill of lading were to be in force, since it appeared that this clause dealt with matters not covered by the charter party.—Centrosoyus-America Inc. v. United States, 30 F. (2d) 302.

* * *

AN ALIEN seaman ceases to be such, and was subject to deportation, at the moment when, without the intention to reship, but with the intention to reside unlawfully in the United States, he deserted his ship. Such seaman, residing in the United States but eight months, was subject to quota restriction, and was excluded from re-entry as against the claim that he was an alien returning from a temporary visit abroad, and that he had merely taken a pleasure trip. No domicile in the United States can be established by an alien whose original entry was unlawful.—Hurst v. Nagle, 30 F. (2d) 346.

* * *

A NUMBER allotted to a motorboat of less than 5 net tons, under section 288 of 46, United States Code, is a record or document granted in lieu of a certificate of registry, enrollment, or license, within section 60, providing that, whenever such certificate is knowingly and fraudulently obtained or used for any vessel not entitled thereto, the vessel shall be subject to forfeiture. A vessel not registered, enrolled, or licensed, but having only a number allotted, is not authorized to be employed in trade, foreign or coasting. In view of the above, it was held in the case of Stephens v. United States, 30 F. (2d) 286, that where, after a number was allotted to a gas motorboat of less than 5 tons net, the vessel was altered to increase her tonnage to over 11½ tons net, and was seized while on the navigable waters of the Gulf of Mexico, she was subject to forfeiture, the use of said allotted number being fraudulent, though no financial loss to the government was involved.

* * *

IN THE case of Tatsuma Kisen Kabushiki Kaisha v. Robert Dollar Co., 31 F. (2d) 401, it appeared that the bill of lading involved provided that, if the vessel be prevented by stress of weather, war, blockade, seizure, restraint, riot, strike, lockout, interdict disease, or any other cause of whatsoever kind from entering the port of delivery on her arrival at or near the same or from discharging any or all merchandise, or if in the judgment of the ship's master or agent it be impracticable to discharge, merchandise may be retained on board vessel and returned to her port of original shipment, or may be landed and delivered or stored at any port at the owner's cost and risk, the master's conduct in discharging the cargo billed for Hongkong at Kobe was justified by reliable information that the port of Hongkong was closed because of strikes and riots. In discussing the terms of the bill of lading the court said, "What will be deemed at or near the port of delivery within the meaning thereof must, of course, depend upon the facts of each case. The object of the stipulation was to enable the master to guard against obstacles which might prevent his vessel from making her destination in due course. It is not to be supposed that it was intended to apply only if the vessel actually arrived safely at the port of destination, if the master had, prior to that time, reliable information the port was closed, on account of strikes, riots, etc., and it would therefore be impracticable and unsafe for him to enter the port or attempt to discharge his cargo."

* * *

IN DETERMINING the amount of demurrage, allowance should be made for bad weather and for holidays, including Saturday as a half holiday and Sunday as a whole holiday.—Ocean Carriers Co. v. Cargo of Cork, 30 F. (2d) 288.

* * *

TO BIND a vessel in rem, supplies must not only be ordered for a particular vessel, and be shipped or delivered for the particular vessel, but they must also be actually or constructively put on board that vessel.—AMERICAN EAGLE, 30 F. (2d) 293.

* * *

WHERE owner, master, and crew are all entitled to salvage, said the court in the case of Holmes v. City of New York, 30 F. (2d) 366, it must be quite immaterial whether a representative suit is brought by the owner or by the master. It is a general characteristic of the admiralty, and a useful advantage of its flexible procedure, that the master or owner of a vessel may bring, in his own name, actions which other interested parties may have in relation to the ship, her cargo, freight, and passengers. Thus either the master or owner may bring suit in his own name on behalf of the cargo for collision damages, or on behalf of the owner to recover for breaches of contracts of affreightment.

* * *

ANY licensed vessel which is employed in any other trade than that for which she is licensed is subject to seizure and forfeiture. The unexplained fact that a vessel licensed to be employed in the coasting trade was at sea, with a cargo of merchandise aboard, is enough to show that she was employed in trade. In the present instance, the vessel involved was transporting a large amount of intoxicating liquor, and the court held that her forfeiture was properly authorized.—Le Bouef v. United States, 30 F. (2d) 394.

* * *

CLAIMS against the owner of a ship for injuries sustained by persons employed as able seamen in navigating a craft on waters of the Pacific ocean were held in the case of In Re Famous Players Lasky Corp., 30 F. (2d) 402, to be within admiralty jurisdiction, and not limited to the California Workmen's Compensation act, though the business of sailing the craft was for the purpose of taking moving pictures, and some of the claimants were in uniform.

* * *

IT IS not unlawful for a foreign schooner to be sailing with a cargo of liquor outside the territorial jurisdiction of the United States. Such a ship does not become bound to the United States because she was towed there by a coast guard boat, and there was no right to board her and seize her for not producing a manifest.—GEORGE AND EARLE. 30 F. (24) 441.

* * *

NO PRESUMPTION of liability arises from the mere fact of a collision with an anchored dredge, since permission to dredge to anchor and to have a scow alongside her did not give her all the privileges of a vessel at anchor on an anchorage ground.—BRONX, 30 F. (2d) 452.

* * *

TO SUSTAIN the defense of inevitable accident, a tug, against which recovery is sought for collision with tow, must either point out the precise cause of the accident and show that it was not negligent in connection with it, or it must show all possible causes, and that it was not at fault in connection with any one of them. The defense of inevitable accident cannot be sustained if it be shown that there was lack of display of nautical skill on the part of the master of the tug.—BRONX, 30 F. (2d) 452.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October	564	2,591,207	561	2,561,403
September	577	2,642,897	567	2,548,764
August	584	2,537,306	626	2,775,730
July	580	2,648,419	588	2,582,929
June	575	2,511,671	582	2,582,929
May	605	2,612,925	640	2,782,012
April	626	2,677,963	606	2,547,409
March, 1929	576	2,428,002	599	2,587,030

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	87	237,510	49	143,761
November	80	222,026	48	133,872
October	99	262,305	62	154,401
September	107	282,105	61	145,895
August	110	271,857	54	120,595
July	120	321,726	70	188,269
June	97	254,811	61	140,065
May	126	343,548	75	191,192
April	118	318,240	76	194,158
March, 1929	117	309,233	81	203,080

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	95	286,749	62	208,978
November	101	332,269	67	221,318
October	95	310,386	56	196,590
September	139	387,061	106	265,839
August	139	387,061	106	265,839
July	151	376,620	109	327,487
June	135	309,662	103	268,270
May	139	343,990	113	286,147
April	125	328,493	87	221,533
March, 1929	90	305,532	59	209,077

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	22	47,329	23	51,644
November	26	51,231	26	50,475
October	25	54,402	25	56,022
September	30	58,497	30	64,559
August	32	59,299	31	58,111
July	31	55,932	31	53,761
June	29	49,060	28	47,961
May	24	39,080	25	39,830
April	20	45,922	21	48,999
March, 1929	15	36,185	15	38,415

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	10	35,615	4	16,406
November	10	38,203	6	22,371
October	6	20,741	8	32,974
September	9	38,226	5	23,339
August	6	24,438	6	25,315
July	12	38,408	9	29,585
June	11	40,920	7	31,040
May	11	39,061	5	18,506
April	5	20,267	5	17,898
March, 1929	5	19,121	5	21,902

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	39	146,486	53	118,117
November	34	129,809	65	234,575
October	39	148,172	59	221,007
September	33	129,576	52	191,302
August	45	166,207	65	229,834
July	42	151,702	54	198,109
June	30	109,084	47	170,643
May	26	98,630	48	172,196
April	36	136,793	47	169,257
March, 1929	45	170,528	64	232,651

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	134	415,201	134	425,362
November	132	438,274	137	446,120
October	138	450,603	146	463,723
September	117	374,893	108	355,532
August	141	444,315	150	466,464
July	160	499,292	158	485,913
June	135	430,355	134	427,138
May	155	478,043	155	465,843
April	158	471,851	156	465,710
March, 1929	131	401,217	138	426,539

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1929	39	50,600	79	204,216
October	32	87,466	79	209,997
September	27	67,040	74	189,010
August	32	86,983	95	256,104
July	32	74,562	97	220,215
June	23	39,983	78	160,520
May	29	80,599	89	228,221
April	20	54,399	73	215,664
March	22	55,442	84	217,780
February, 1929	20	55,902	58	155,238

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
November, 1929	10	22,938	10	18,750
October	12	20,268	8	19,134
September	17	36,618	13	23,731
August	18	45,422	10	15,617
July	12	21,338	12	22,111
June	14	21,699	16	35,889
May	12	24,974	12	26,010
April	15	33,734	13	27,662
March	20	25,950	16	21,897
February, 1929	17	27,851	9	13,422

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	68	78,984	65	78,634
November	84	97,555	83	97,217
October	74	88,850	75	88,853
September	55	64,464	59	72,321
August	60	70,851	60	68,913
July	72	84,674	67	80,233
June	68	81,920	68	78,980
May	99	110,911	100	110,658
April	79	77,934	75	77,672
March, 1929	77	82,370	76	96,935

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	110	262,685	101	238,149
November	107	231,376	111	259,712
October	123	304,950	119	294,276
September	91	208,323	83	213,660
August	96	233,785	83	193,379
July	110	267,053	109	264,552
June	97	204,219	98	218,437
May	89	211,519	75	168,343
April	102	213,941	77	174,116
March, 1929	102	220,251	105	264,084

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	57	292,419	62	302,713
November	68	278,207	73	306,493
October	72	293,569	68	277,041
September	46	203,192	47	203,236
August	62	258,910	63	263,569
July	64	259,303	62	252,021
June	48	199,237	56	233,867
May	51	216,463	53	221,564
April	62	264,744	61	254,647
March, 1929	57	234,394	59	248,901

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1929	244	681,983	261	713,490
September	257	684,203	260	698,665
August	272	726,363	273	721,024
July	279	712,324	288	741,716
June	277	708,089	273	711,898
May	289	758,671	277	717,581
April	294	751,444	278	708,155
March	283	773,515	298	517,632
February	248	682,052	249	675,432
January, 1929	273	710,969	282	744,078

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
April, 1929	24	62,976	26	62,467
March	14	37,470	18	46,087
February	26	78,237	26	66,648
January	23	54,709	25	57,589
December	20	46,569	17	43,041
November	22	56,983	22	50,043
October	24	59,136	26	61,673
September	21	60,956	22	54,537
August	24	62,574	26	63,874
July, 1928	26	59,204	27	61,976

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	27	65,306	104	358,823
November	28	68,030	108	332,315
October	36	88,056	118	385,367
September	47	131,512	101	323,955
August	37	87,502	74	275,017
July	36	72,793	87	259,450
June	35	75,614	78	243,391
May	37	79,121	79	220,456
April	36	82,330	93	294,062
March, 1929	33	62,486	77	221,143

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August	204	583,568	185	554,520
July	203	705,042	169	620,250
June	186	574,459	159	582,247
May	167	604,274	224	597,519
April	175	546,939	184	650,172
March, 1929	177	572.573	180	523,807

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1929	182	632,677	148	558,136
November	161	620,878	143	579,803
October	179	696,620	164	667,367
September	151	563,770	134	559,772
August	196	723,330	168	669,499
July	173	680,770	153	621,762
June	167	643,580	147	584,361
May	179	643,864	165	613,836
April	173	673,174	153	606,246
March, 1929	176	655,851	174	692,407

Port Arthur

(Including Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
May, 1929	22	76,344	26	87,941
April	21	79,267	23	81,991
March	25	76,152	27	81,778
February	16	53,310	21	68,705
January	22	68,758	24	76,496
December	21	65,710	14	43,776
November	23	71,313	23	69,425
October	19	58,857	19	58,686
September	22	73,785	24	79,696
August, 1928	25	78,765	23	72,389

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 62 of 224,185 net tons entered and 76 of 260,977 net tons cleared for the month of December.

Reviews of Late Books

The St. Lawrence Navigation and Power Project by Harold G. Moulton, Charles S. Morgan, and Adah L. Lee, cloth, 675 pages 4⅞ x 7¼ inches, published by the Brookings institution, Washington, and furnished by MARINE REVIEW, Cleveland for $4 plus 15 cents for postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London for 20s.

This thorough going and extensive analysis considers the St. Lawrence project in both its transportation and water power aspects. The volume is the result of the co-operation of a number of economists, traffic experts, and engineers, working over a period of several years. A great deal of aid was extended in connection with the technicalities of the work by industrial traffic managers and steam ship companies. This book represents, probably without doubt the most complete and authoritative study of this great inland project.

The analysis shows that the cost of the proposed waterway has been greatly underestimated; and that, furthermore, a depth of 33 rather than 27 feet would be required if modern cargo vessels engaged in transoceanic trade are to be accommodated. It demonstrates further that ocean shipping would not utilize the route extensively if it were to be built; and that the traffic available is very much less than has been commonly assumed. As a further objection, the analysis states that the St. Lawrence waterway is not needed as a means of combating traffic congestion on the railroads, nor as a means of controlling railroad rates either now or in the future. The volume points out further that while undoubtedly the water power development would eventually prove desirable, still for some years to come this power cannot be marketed at a price sufficient to cover the cost of its development.

The Coast Guard—Its History Activities and Organization, by Darrell Hevenor Smith and Fred Wilbur Powell, cloth; 265 pages, 5½ x 8½ inches, published by the Brookings Institution, Washington and furnished by MARINE REVIEW, Cleveland for $1.50 plus 15 cents for postage, and in Europe by the Penton Publishing Co., Ltd., Caxton House, London, for 7s 6d.

This work, which is No. 51 of the Service Monographs of the United States government, was prepared as were the other volumes, at the instance of the institute for government research, an association of citizens which co-operates with public officials in studying the various branches of government scientifically with the purpose of promoting efficiency and economy in its operation and to advance the science of administration.

The present work follows the uniform plan of the series: It gives a history of the establishment and development of the Coast Guard service; describes its functions by detailing its specific activities; describes its organization for handling these activities; describes the character of its plant; compiles the laws and regulations governing its operations; gives financial statements showing appropriations and expenditures; and lastly, gives a complete bibliography of the sources of information, official and private, bearing on the service and its operations.

This monograph gives an exact knowledge of the organization and operations of the Coast Guard and will serve as an essential tool for efficient legislation, administration and popular control. It also lays the basis for critical and constructive work on the part of those upon whom responsibility for such work primarily rests.

Canals and Inland Waterways, by George Cadbury and S. P. Dobbs, B. A., cloth 160 pages 5⅜ x 8⅜ inches, published by Sir Isaac Pitman & Sons, Ltd., London and furnished by MARINE REVIEW, Cleveland for $2.25 plus 15 cents for postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London for 12s 6d.

The aim of the authors of this book is to clear up a great deal of misunderstanding which has existed in the past in regard to the canals and waterways of Great Britain. Feeling that there are comparatively few people who appreciate the commercial existence or legitimate sphere of usefulness of the country's inland waterways a short history is given of canals of early times together with a discussion of early attempts at canalization within the British empire. In this connection, a comprehensive summary covers the general subject of canal construction in Great Britain, tracing the growth of this development from 1760 down to the present time. The year 1760 is taken because of the fact that the commercial position of England at that time was particularly inducive to a program of canalization. The authors, in the early pages of the work, briefly discuss the various British canals: the Bridgewater canals, the Trent and Mersey canal, the Staffordshire and Worcestershire canal, the Leeds and Liverpool canal, canals in the south of England, the Grand Junction and the Regent's canal, Scottish canals, etc.

Following the opening discussion of the general subject, organization and finance of the canals is presented, the economic and social effects of canals outlined and discussed. A chapter is devoted to a general discussion of railway competition with the canals (1840-1905), and the reasons given for the failure of the canals to meet railway competition. This chapter contains a review of canal conditions at the close of the last century with figures showing to what extent the canals were owned by railroads.

In subsequent chapters the following topics are presented: Construction and maintenance of canals; operation and organization of canal traffic; canal finance; some leading inland waterways; canal history since 1906; rail and road competition; and the future of British canals.

This book would be found of especial value to students interested in the subject of canals and waterways and to those who for one reason or another desire enlightenment on the subject.

Practical Color Simplified, by William J. Miskella, M. E., 113 Pages, 5¾ by 9 inches, published by Finishing Research Laboratories, Chicago and furnished by MARINE REVIEW, Cleveland, for $3.50, plus 15 cents postage, and in Europe by the Penton Publishing Co. Ltd., Caxton House, London, for 17s 6d.

The work is a very interesting treatment of the subject of practical finishing and contains the latest and most concrete information on the use of colors. Even though inexperienced, the reader will have little difficulty in locating the subject matter covering the point in question so clearly is the material presented.

This book contains all the general and important information as related to the finishing industry on the choosing, mixing, matching and harmonizing of colors, incidental to practical finishing.

Included also in the book is new information on colored lighting which is a very important subject for interior decorating the experts of which must consider lighting in selecting proper tints and shades for walls and ceilings.

Besides the topics mentioned above, the book treats of such closely related subjects as color photography, and the relation of color and business.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

IN A testimony given by Postmaster General Brown Jan. 12, before a subcommittee of the house committee on appropriation, details were presented concerning two of the fastest types of ocean liners and two of smaller size and less speed which would be required to be built under the terms of proposed ocean mail contracts.

According to Mr. Brown's report, the two super liners would be of the BREMEN type, of 48,000 tons, which is smaller than the LEVIATHAN, but with a speed of 28 knots. Each vessel, according to him would cost between $25,000,000 and $30,000,000.

The plan is have the new liners form a part of a fleet of three vessels, of which the LEVIATHAN would be the third if the United States lines should acquire the mail contracts. This arrangement would provide weekly five-day sailings between New York and Southampton by way of Cherbourg. In event that another line should obtain the proposed ten-year mail contract, it would have to build three of the super liners. It was indicated throughout the hearing, however, that the United States lines' were the basis for consideration.

Two smaller ships, which would be operated on a slower service between New York and Hamburg with stops at Channel ports, would be of 20,000 tons each with a speed of 20 knots and would cost approximately $8,000,000 each. According to Mr. Brown's statement, the larger vessels would earn $43,000 on each eastward voyage, which would make the annual revenue $700,000. The shipping board is prepared and ready to grant loans up to 75 per cent of the construction cost of the vessels.

"The mail contract," states Mr. Brown, "is intended to absorb the difference between the cost of operating under the American flag and the cost of operating under a foreign flag. The low interest rate on the loan is intended to equalize the difference in the cost of producing the ships on this side and in foreign yards."

River Tug Ordered

Contract for a twin screw diesel river tug has been awarded to the Marietta Mfg. Co., Point Pleasant, W. Va., by the Marquette Cement Mfg. Co., Chicago, Ill. from designs prepared by T. R. Tarn, naval architect of Pittsburgh, Pa. The contract price is said to be $135,000 and delivery is to be made in June of next year.

The dimensions of the tug are 120 feet by 26 feet by 7 feet. She will be powered with two Atlas-Imperial engines of 350 horsepower each at 225 revolutions per minute. The stern is of the shallow tunnel type. The propellers have a diameter of six feet and the mean draft of the tug is five feet.

This tug will be used by the Marquette Cement Mfg. Co., to tow the self unloading bulk barges, recently placed in service at their Cape Girardeau plant on the Mississippi river, to their storage and sacking plants at St. Louis and Memphis.

Two Loans Granted by Shipping Board

The United States shipping board on Dec. 18 granted two loans to the Tidewater Associated Transport Corp. of New York for the construction of two 13,450-ton tankers. The loans totaled $2,602,050. The statement of the shipping board was as follows:

Two loans not to exceed $1,301,025 each to be used in aid of building two 13,450-ton tankers for the Tidewater Associated Transport Corp. were granted by the shipping board on December 18. These vessels are to be constructed by the Sun Shipbuilding and Dry Dock Co., Chester, Pa., and will be ready for service in the late summer of 1930.

The two tankers which were described in the January issue of MARINE REVIEW, are to be deep-draft ocean going vessels. They are to be built under special survey to the highest class of the American bureau of shipping. The main propelling machinery is to consist of a single screw driven by one Sun-Doxford opposed piston oil-burning marine engine, developing a shaft horsepower of 2800 and giving the vessels a speed of approximately 11 knots. The capacity of each vessel when carrying crude oil will be approximately 100,000 barrels of 42 gallons each and when carrying gasoline 115,000 barrels. Two four-cylinder Winton auxiliary diesel engines are also included in the machinery installation. These are to be used for supplying electrical power for the electric auxiliaries on board.

The new vessels will probably be used in the foreign trade service of the company in connection with its business in Venezuela, the Dutch West Indies and the Argentine republic.

Build Canadian Tankers

According to A. A. Wales, vice president of the McColl Frontenac Oil Co. Ltd., two new tankers, the steamship CYCLO-CHIEF and the steamship CYCLO-WARRIOR, are under construction in England for the company. The new vessels are to be delivered in May of this year and are to be operated in the transportation of crude oil and fuel oil.

While of the same length and breadth as the JOHN IRWIN, 250 feet long by 43 feet beam, the molded depth of the new tankers has been increased to 24 feet 6 inches, so that depth of water permitting, they will be able to carry a much larger cargo than the aforementioned vessel. The craft are to be used on the present St. Lawrence canals. However, when not employed in this service, their cargo carrying capacity will be considerably greater than that of the IRWIN.

Rebuild Lake Vessel

The vessel FRANK C. BALL, owned by the Construction Materials Corp. of Chicago is to be rebuilt during the winter months at the Lorain yard of the American Ship Building Co. into a combination self-unloader and hydraulic sand boat. The vessel is to have turboelectric drive and is to be employed in filling operations.

Build Porto Rico Liner

The new shipbuilding program of the Atlantic, Gulf & West Indies Co. is making progress. Two turbine electric vessels of 20-knot speed, costing about $10,000,000 for the Ward line run from New York to Havana are under way at the Newport News Shipbuilding & Dry Dock Co. and the keel has recently been laid for the

(*Continued on Page* 66)

Up and Down the Great Lakes

Cargo Movement Breaks Records—December Lake Levels—Ask Bids on Carferry—Builds New Terminal—Appoint Ship Captains

WHILE the movement of iron and steel scrap from the Detroit district eastward has been heavy, scrap shipments by Great Lakes boat from other steel producing and consuming territories to eastern districts is light. In recent months, shippers of scrap in the Chicago district have been giving much consideration to the feasibility of shipping iron and steel scrap to eastern lower lake ports, particularly the Buffalo district.

With a surplus of scrap produced in the Chicago district, it is pointed out such movements would be practical and advantageous. Several Great Lakes carriers now are equipped to handle iron and steel scrap shipments.

Repair Ore Carriers

Four boats of the ore carrying fleet operated by the vessel interest of the M. A. Hanna Co., Cleveland, are being re-tanktopped. The steamers AGASSIZ and E. N. SAUNDERS JR. are having the repair work done at the Ashtabula, O., shipyard of the Great Lakes Engineering Works and the J. J. TURNER and E. A. UHRIG at the Ecorse, Mich., yard. The work involves an expenditure exceeding $200,000.

These boats with the Q. A. SHAW, have been sold to the Producers Steamship Co. A fleet of seven boats now is owned by that company, the other two being the W. A. AMBERG and L. W. HILL.

Ask Bids on Carferry

The Canadian National railway has called for tenders for the construction of a steel carferry steamer for service in Northumberland straits between Cape Tormentine, N. B., and Port Borden, P. E. I. Bids will be received until Feb. 22. The ferry must be completed by July 15, 1931.

Plans for the craft call for a vessel with an overall length of 324 feet, 310 feet between perpendiculars; a molded breadth of 59 feet, and a molded depth of 25 feet; a draught under full load of 19 feet three inches, and a deadweight capacity of 1380 tons. It will be equipped with eight boilers developing 8000 indicated horsepower with three triple expansion engines, two operating the two stern propellers, and the other the bow propeller. It will be of steel throughout with three tracks on the car deck, with a capacity of 16 freight or eight passenger cars. The upper deck will accommodate 40 automobiles, and there will be ample passenger accommodation.

December Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of December as follows:

Lakes	Feet above mean sea level
Superior	602.50
Michigan-Huron	580.81
St. Clair	575.49
Erie	572.82
Ontario	246.45

Lake Superior was 0.31 foot lower than in November and it was 0.40 foot lower than the December stage of a year ago. Lakes Michigan-Huron were 0.33 foot lower than in November and they were 0.18 foot higher than the December stage of a year ago. Lake Erie was 0.01 foot lower than in November and it was 1.02 feet higher than the December stage of a year ago, 1.43 feet above the average stage of December of the last ten years. Lake Ontario was 0.21 foot lower than in November and it was 0.65 foot higher than the December stage of a year ago, 1.34 feet above the average stage of December of the last ten years.

Welding Ship Tank Tops

New tank tops of steel channels welded together are being fitted in the bulk steamers CHARLES O. JENKINS and ISHPEMING. The former is being done at Huron, O. by the Cleveland Stevedore Co. and the latter by the Great Lakes Engineering Works at River Rouge, Mich. This represents a radical departure in the usual tank top construction of steel plates riveted to floors. It is interesting to note that it has been practically demonstrated after trying several methods that the carbon process is best for burning out the rivets in the old tank tops. The new tank tops of channel steel construction will be completely fabricated in the cargo hold by arc welding and will be the first time that this method has been employed for tank tops on Great Lakes vessels. The channel steel system of riveted construction was first used in renewing the tanks on the steamers COLONEL and GRAND ISLAND last year. Electric welding equipment, designed and built by the Lincoln Electric Co. is being used. The channel type of tank top construction was developed by W. G. Bartenfeld for Cleveland Cliffs Steamship Co., who are the owners of the ISHPEMING and the PRESQUE ISLE which is being fitted with new channel steel bilge ceiling, and the Jenkins Steamship Co., owner of the CHARLES O. JENKINS.

To Rebuild Freighter

The American Ship Building Co. at its Lorain yard has contracted to rebuild the freighter FRANK C. BALL.

The vessels which is an ore carrier 530 feet long, 56 feet beam, and 31 feet draft, is to be converted into a combination stone and sand boat. The rebuilding is to require three months and it is understood that the vessel is to be ready for the opening of the 1930 season of navigation. When completed, the vessel will be the largest in the sand trade. The BALL is to have turbo-electric drive. She is owned by the Construction Materials Corp. of Chicago.

Protest Senate Bill

The International Shipmaster's association at a meeting in the Perry-Payne building in Cleveland Jan. 10, unanimously adopted a resolution protesting Senate bill No. S 306, the purpose of which is to establish government shipping commissioners in all major ports of the Great Lakes. Not only are the commissioners established by the bill, but heavy penalties are provided for any ship captain neglecting to hire or discharge seamen in the presence of a commissioner.

According to George A. Marr, secretary of the Lake Carriers' association who read and explained portions of the bill to the assembled shipmasters, adoption of the bill would mean an unavoidable annual cut of 15 to 20 per cent in the tonnage of the four chief commodities. Based on the total tonnage figure of last year,

which was over 138,000,000 net tons, the decrease with this new bill in effect would have been 20,000,000 tons.

As provided by the bill, payment of a fine of $500 would be required of any ship master for failure to ship or discharge any of his crew in the presence of one of the government shipping commissioners or customs officials, except at ports where no such officers are stationed. According to Mr. Marr, the loss of time in Cleveland alone would be enormous under the proposed law.

A further provision of the bill, which is in the hands of the senate commerce committee prohibits shipping or discharging men unless a gangplank is in place between ship and shore. At the same time, however, the crew is permitted to quit the ship whenever it is anchored or moored in a safe harbor. Mr. Marr also called attention to the difficulty of observing one section of the bill which provides a fine of $200 for every seaman hired who does not possess qualifications for United States citizenship.

Under terms of the resolution adopted at the meeting of the association in Cleveland, protests are to be sent to congressmen and to the chamber of commerce of all lake cities. It is the intention of Mr. Marr to read and discuss the bill before the shipmasters' lodges of all the principal lake ports.

Builds New Terminal

Plans are under way by the Shell Petroleum Corp. to construct a bulk terminal on the Maumee river at Toledo for the purpose of supplying the territory thereabouts with gasoline from the East Chicago refinery of the company. Shipments to Toledo are to be made by water and distributed there by rail to other parts of Toledo. The Toledo terminal which will cost $425,000 when completed is one of a number of such projects either proposed or under consideration by the company.

The Toledo terminal is on an eleven-acre tract of land recently purchased. Storage tanks which are now under construction are to be 40 feet in height with a capacity of 39,500 barrels. These tanks are to be lowered about 20 feet below the street surface. Fire walls around each of the tanks prevent the possibility of fire spreading or gasoline overflowing and either injuring adjacent property or reaching the river. This safety feature is made possible by the capacity of the protecting wall which is greater than that of the tank itself. It is the plan of the company to dredge a new boat slip, permitting a direct waterway between the new wharf and open water on the Lakes, and thence through Lake Michigan to the loading wharf at the East Chicago refinery.

Bulk Cargo Movement Breaks All Records

ALL previous records for total bulk cargo movement on the Great Lakes were broken in the year 1929. *The maintenance of quicker turn arounds, resulting in greater efficiency of the fleet was without doubt responsible for this great movement. As noted in the table below, there was an increase in each of the great bulk movements except that of grain which showed a large decrease over last year's figures. On the other hand, the tonnage of the other commodities moved—iron, ore, coal, and stone—was sufficienly greater than last year to make the grand total of the* 1929 *season over* 11,000,000 *net tons greater than a year ago.*

Commissioner Dies

John H. Currie, commissioner of the Lake Carriers' association at Toledo since 1916, died Thursday Jan. 9 after an illness of several months' duration. Having been employed as commissioner or assistant commissioner of the association since 1907 except for a short period in 1913, when he was second mate on the steamer WILLIAM LIVINGSTON was very well known among vesselmen on the lakes.

To Hold Annual Ball

Cleveland Lodge No. 4 of the International Shipmasters association of the Great Lakes has announced that the Seventeenth Annual ball of the association is to be held on Friday, Feb. 7, at the Hollenden hotel in Cleveland.

Hold Elections

On the evening of Dec. 30, the Marine Engineers association No. 2 elected the following officers for the coming year: President, Edward Lautermilch; first vice president, James Randall; second vice president, James Kingsley; recording secretary, H. L. Kennedy; corresponding secretary, William Kelly; financial secretary, H. C. Downs; treasurer, David Conway. The annual ball of the association is to be held Feb. 13 at the Hollenden hotel at Cleveland.

Transfer Commissioner

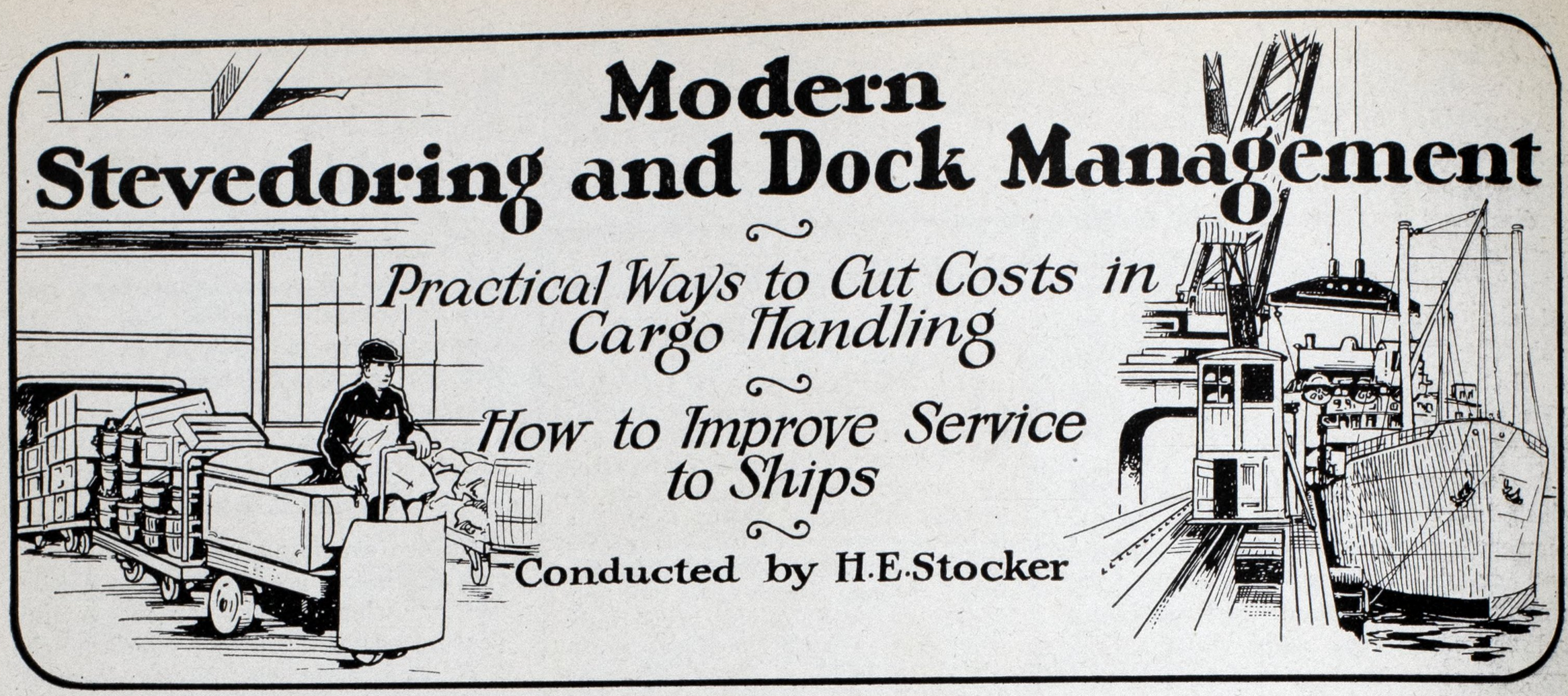
A. J. Zimmer, who in recent years has been commissioner of the Lake Carriers' association at South Chicago, has been appointed commissioner at Buffalo, replacing Commissioner J. A. Ehnes who was transferred to Erie. Commissioner Ehnes was promoted from first assistant commissioner two years ago to succeed the late Albert H. Lambrix. Commissioner Zimmer was born in Buffalo, but has spent the greater part of his life in Chicago. Shortly after joining the staff of the Lake Carriers' association at Cleveland in 1917 as one of the assistants in the commissioner's office, he entered the United States army and spent two years in France. Returning from France in 1919, he was made assistant commissioner for the Lake Carriers association in Chicago and in 1922 was transferred to Buffalo as second assistant.

It is understood at least one coast guard cutter for rescue and assistance work on Lake Michigan is to be built this year. The measure is now before the house of representatives.

Bulk Cargo Movement—1929

Shipments on the Great Lakes for Last Year Compared with Ten Preceding Years

Year	Iron ore Gross tons	Coal net tons	Grain, various kinds net tons	Stone net tons	Total net tons
1929	65,204,600	39,254,578	10,021,099	16,269,612	138,574,441
1928	53,980,874	34,823,002	16,372,116	15,677,551	127,329,348
1927	51,107,136	34,794,291	14,692,536	14,033,376	120,760,195
1926	58,537,855	31,011,544	12,087,316	12,628,244	121,289,502
1925	54,081,298	28,127,359	13,320,346	11,351,948	113,370,707
1924	42,623,572	25,860,515	15,222,787	9,225,624	98,047,327
1923	59,036,704	33,137,028	11,850,446	9,920,422	121,029,004
1922	42,613,726	19,868,925	14,267,020	7,592,137	89,454,848
1921	22,300,726	26,660,652	12,470,405	3,925,705	68,033,575
1920	58,527,226	26,409,710	6,736,348	7,821,980	106,518,531
1919	47,177,395	26,424,068	6,091,703	6,407,285	91,761,238



Modern Method of Handling Lumber at Pacific Coast Seaports

By H. L. Potter

THE annual movement of lumber, logs, piling and poles by water from Pacific coast ports is around six billion feet, or approximately 40 per cent of all the lumber manufactured in this region and the Pacific coast is now producing about half the lumber cut of North America. Lumber is a bulky and moderately heavy commodity, which must be shipped in rather long lengths. The bulk, attended by the necessity of so storing as to permit the separation of parcels at destination, are two factors which complicate the mechanical handling of lumber in ships.

As a rule orders which move by water are rather large, and in any event a vessel which takes on a lumber cargo takes on board a lot of bulky material in a short time. This means that the sawmills have to cut and pile the lumber in advance of the dockage of the vessel. The initial step of transporting unit packages from the sawmill to the shipping dock may be done by crane or more frequently upon the Pacific coast by lumber carrier. As a rule lumber from the sawmill is only roughly graded and is regraded upon the dock. It is then stacked, usually in solid piles, to await vessel arrival, when it is tallied and generally regraded as it is made up into sling loads.

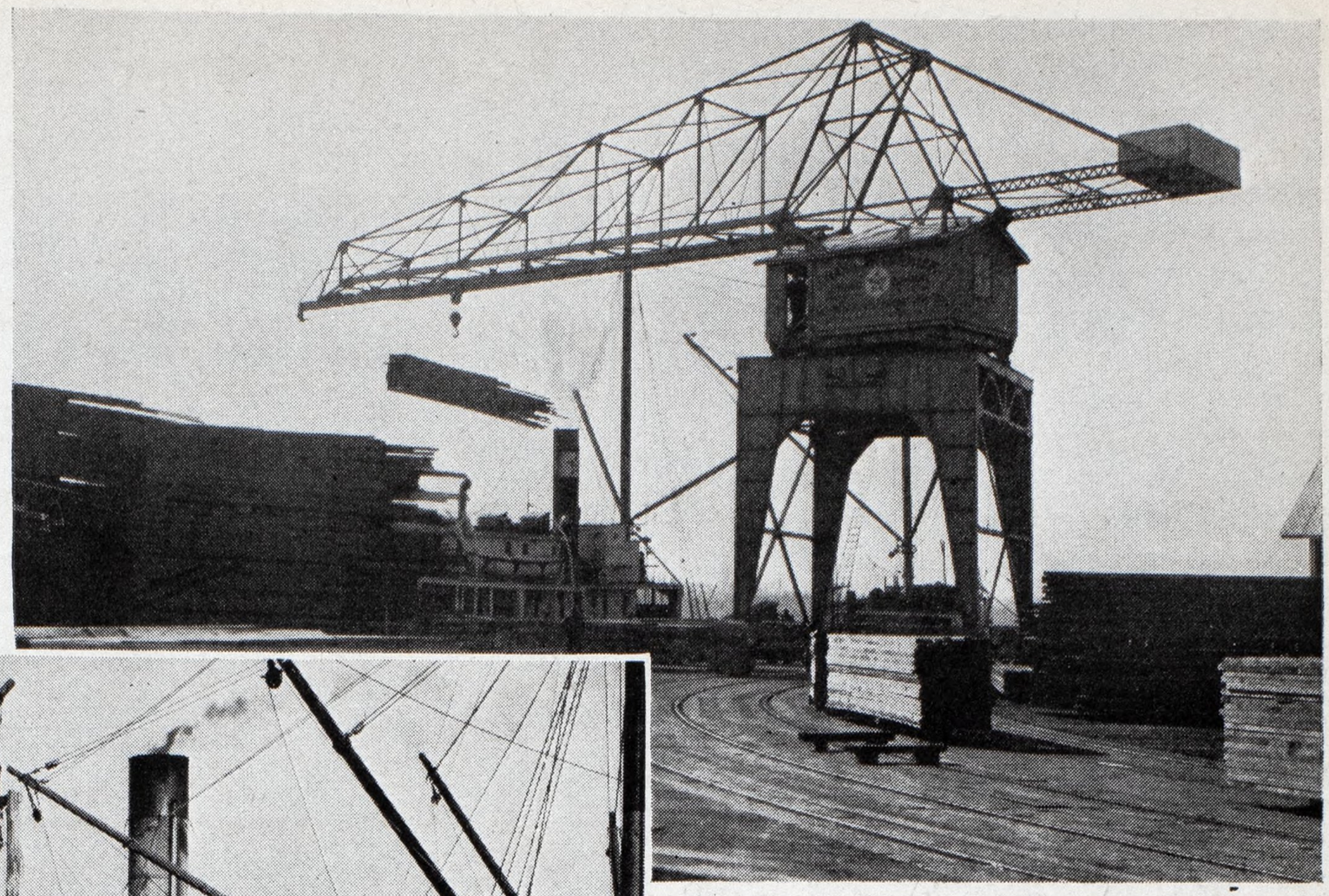
As may be seen from this there is a great deal of manual handling involved, with the major machinery handling consisting of lumber carrier transportation from the sawmill to the dock, and then the piling and unpiling of units of lumber by cranes, mainly hammerhead locomotive crawler equipped types.

In a few instances special lumber

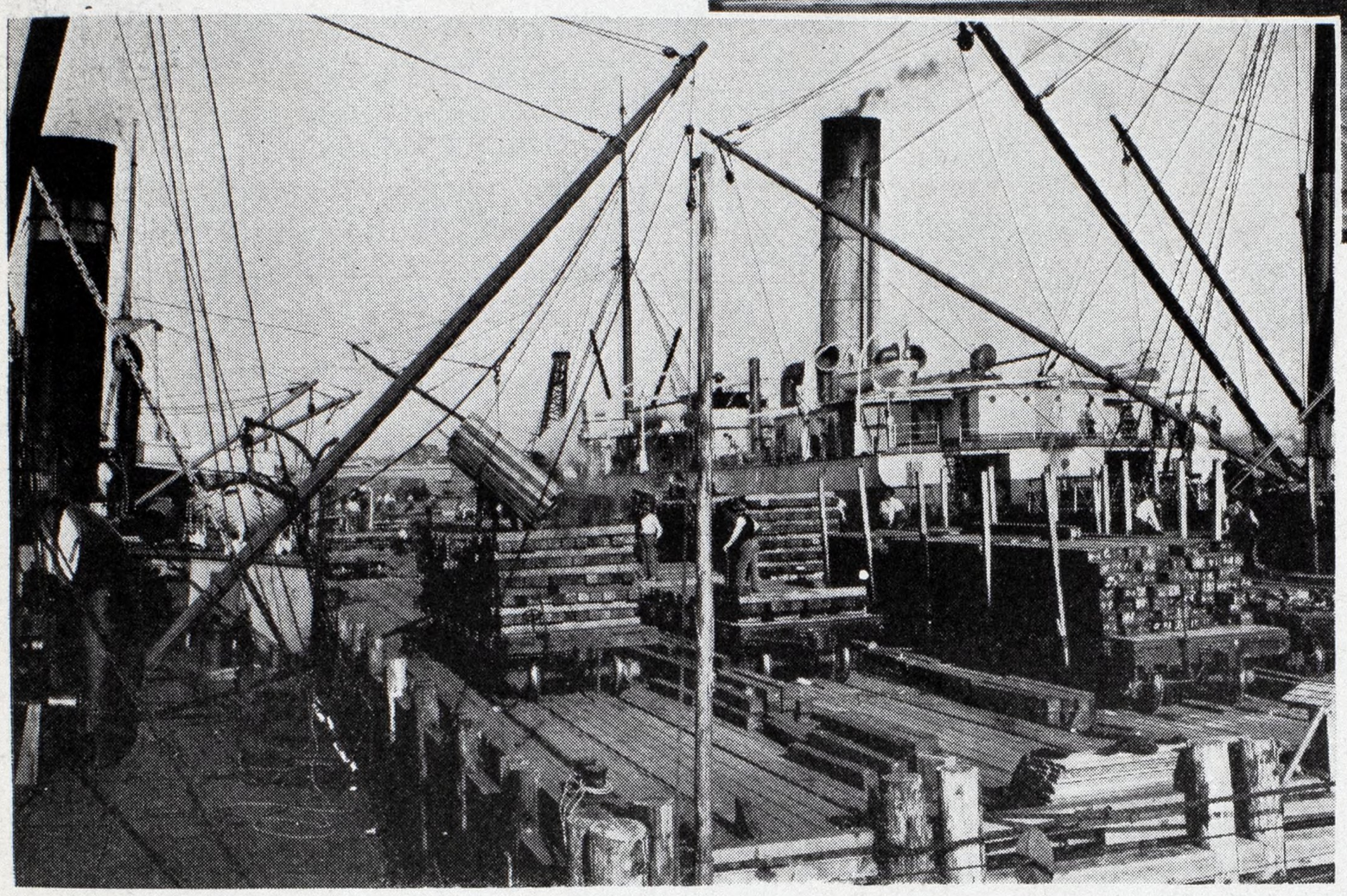


Bird's-eye View of the Port of Seattle—Smith's Cove Lumber Assembling Terminal, Piers 40 and 41

handling equipment has been devised. Perhaps the most outstanding development of this type is that of the Coos Bay Lumber Co., Marshfield, Oreg. In this case the lumber is made up into unit packages at the sawmill, transferred to the dock as units, where each package is fitted into steel stirrups. It is then piled on the dock by a gantry crane, which has a travel along the entire face of the dock. Upon berthing of the lumber carriers, which are designed especially for this service with unusually large hatches; the units loads are



A Hammerhead Crane Handling Lumber at the Dock



Steamers Discharging Lumber to Railroad Cars at the McCormick Lumber Co. Wharf, San Diego, Calif.

lowered by the gantry crane and stored in the hold. A similar unit unloads the vessels at Bay Point, Calif. The steel stirrups are carried back north each time from the preceding load. The rapidity of loading and unloading and the economy of handling are remarkable, but of course the vessels are used exclusively on one run for lumber handling.

Upon the Columbia river most lumber is loaded from docks of the lumber manufacturers. Most of the package handling is done by cranes, with the hammerhead and crawler cranes about equally popular. In most cases actual lowering into the hold is by means of ships' tackle.

A number of Pacific coast ports operate docks exclusively for lumber handling. At Tacoma, Wash., for example, Pier No. 1 of the Port of Tacoma, is used exclusively for lumber shipments and has an open capacity of 15,000,000 feet. Its equipment consists of two 90-foot electric hammerhead cranes, with 5-ton capacity. One crane sorts, stores and delivers to the vessel. The other sorts and handles for back storage. The trackage of both cranes is around 500 feet long. As much as 700,000 feet of lumber has been handled from this dock to ship's side in one day. Switch engine service is provided to shift loaded or empty cars in and out, so that they may be unloaded directly onto vessel.

The Smith's Cove terminals of the Port of Seattle are largely used for handling lumber. Pier 40 is 310 feet wide and 2540 feet long, having a berthing space of 3700 lineal feet. There are about four miles of railroad track on this pier, there being four lines of depressed tracks down the center with two tracks on each side of the open pier and one track on each side of the transit shed. On the east side of the pier there is a 5-ton traveling gantry crane of 22 horsepower, electrically driven and lighted for night loading. This serves a section of the open pier about a thousand feet long. The gantry crane serves the depressed tracks in the center of the pier, also 40 feet of the slip outside, so that lumber can be loaded direct from cars on the depressed tracks, or from tracks alongside the pier to ship or vice versa; or can be stored on the pier for fu-

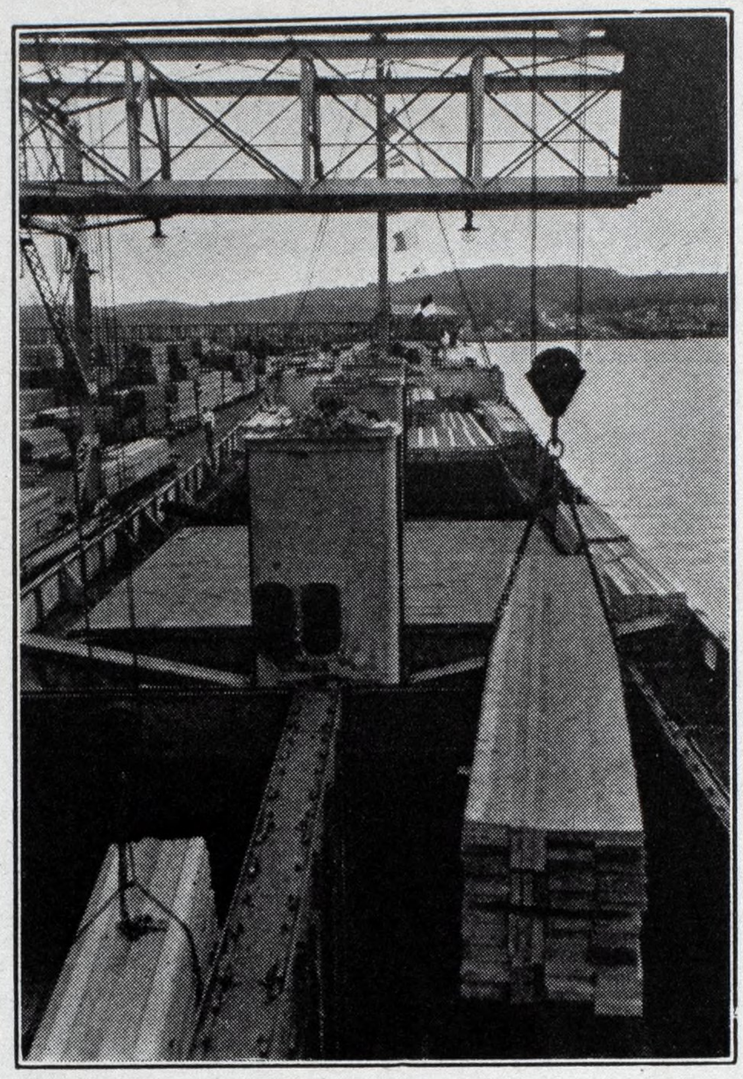


Electrically Operated, Traveling Portal, Revolving, Hammerhead Crane—Capacity 5 Tons. Lumber is Stored in Unit Packages—Hoist Speed, 100 Feet Per Minute

ture shipments. There are also three locomotive cranes, two of 35-tons capacity and one of 15 tons; also gas and electric tractors and trailers and a shear leg derrick of 125-ton capacity. Pier 41, which is larger than pier 40, and is said to be the largest commercial pier in the world, also has facilities for handling lumber which are similar to those of pier 40.

The illustration on page — shows a lumber loading crane in action. It is a traveling portal, revolving, hammerhead crane, all electrically operated, with individual motor drive and travel, hoisting and rotating motions. Its live load capacity is 5 tons; hoist speed 100 feet per minute; trolley speed, full load, 100 feet per minute; rotating speed, 300 to 375 feet per minute; crane travel speed, 250 to 300 feet per minute. The gross weight of the crane in operating condition is a little more than 83 tons. It will be noted that the lumber is stored in unit packages.

As in all specialized trades the handling of lumber from ships to railroad cars and vice versa has been highly developed mechanically. Speed and great efficiency have been attained by the application of special crane equipment designed to meet the peculiar needs of the trade. Hand labor has been reduced to a minimum thus reducing the time and cost of handling this trade at Pacific coast ports particularly serves as a fine example of the application of labor saving machinery in handling nonuniform bulk cargo. Study of this method may lead to a better way of cargo handling in other trades.



Unit Loading of Lumber at Coos Bay Lumber Co., Marshfield, Oreg. This is an Economical Arrangement for Loading Lumber

Matson Line Advances Five Officials

Advancement of five Matson line officials, effective Jan. 1, was recently announced by W. P. Roth, president of the company. Hugh Gallagher, assistant operating manager and formerly operating manager of the Oceanic Steamship Co. when the company was purchased by the Matson line, will become operating manager, succeeding Capt. C. W. Saunders, retired. F. A. Bailey, secretary of the Matson line, was promoted to vice president and secretary; Capt. F. M. Edwards, general superintendent, to assistant operating manager; Irwin Scott, assistant general superintendent to general superintendent and Sidney G. Walton, secretary of the Oceanic & Oriental Navigation Co., to assistant secretary.

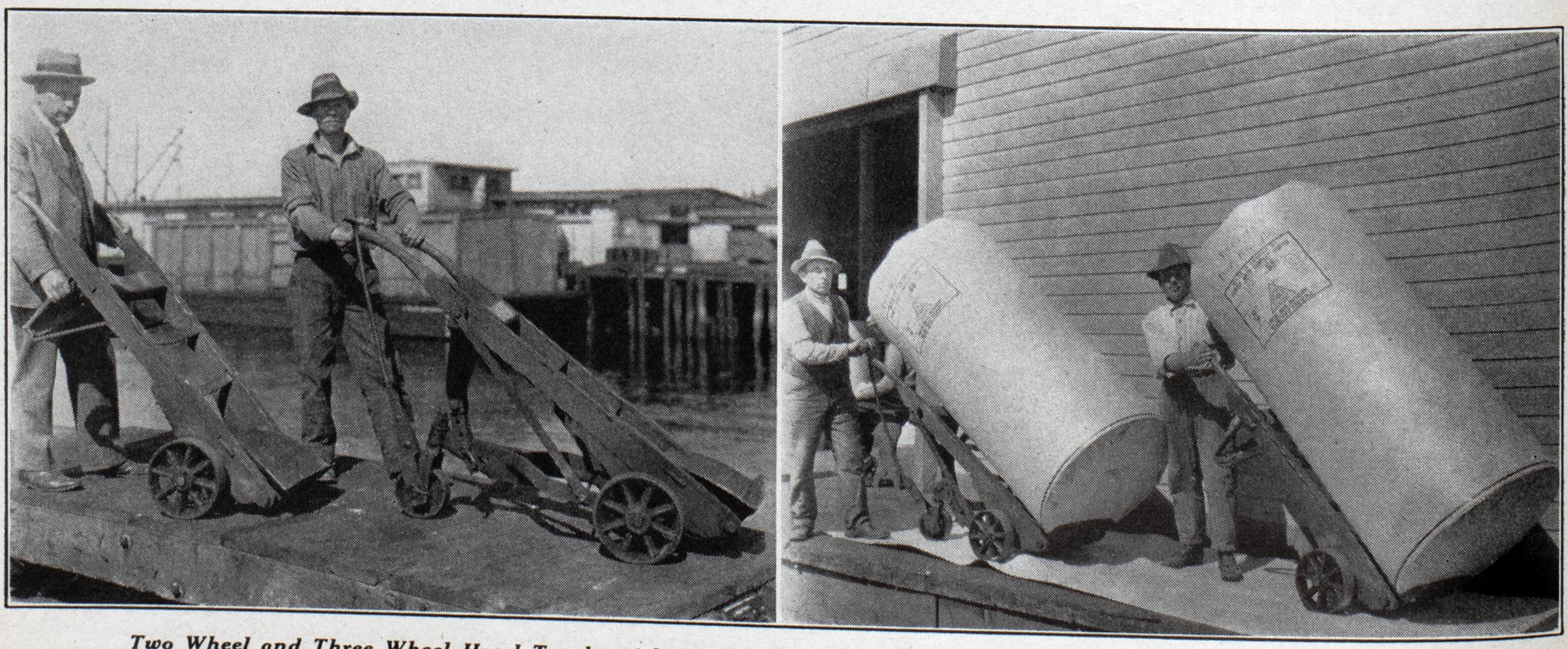
The recently organized Hampton Roads Shipbuilding Corp. has taken over the plant of Spear Engineers Inc., Portsmouth, Va. The charter of the new company gives the following officers: Edward E. Gann, Washington, president; H. B. Spear, Norfolk, vice-president and Joseph Murdaugh, Norfolk, treasurer.

Handling Newsprint in the Modern Way

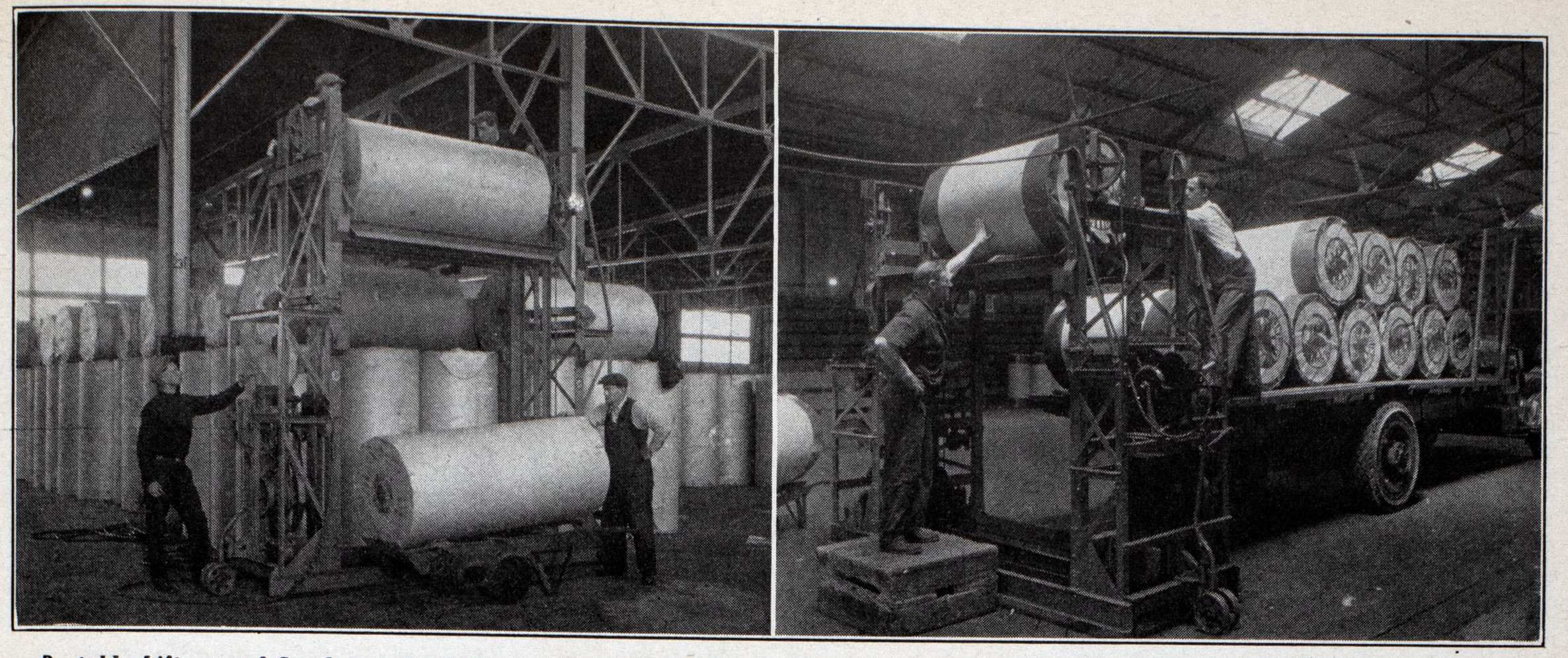
THE principle of the "one best way" was discussed in the October issue. It was pointed out that finding the one best way of doing any particular job is the very essence of scientific management. A trade paper must be a constructive force in an industry. Therefore the MARINE REVIEW is actively gathering facts and ideas from many sources that will assist its readers in finding the one best way of handling various commodities.

This article deals with handling of newsprint with a special type hand truck at the wharf of the Powell River Co. Ltd., at Powell River, B. C. and the use of stackers at the piers of the New York Central Railroad Co. in New York harbor.

The Powell River Co. uses two wheel and three wheel hand trucks for handling newsprint. The illustrations accompanying this article show clearly the construction of the trucks and the manner in which they are used. The scoop device used in place



Two Wheel and Three Wheel Hand Trucks with Special Scoop Device for Handling Newsprint at Powell River, B. C.



Portable Lifters and Stackers. Used for Handling Newsprint. At Left—A 1500-Pound Electric Lifter for Piling Roll Stock on Piers. At Right—Loading 1300-Pound Rolls on Motor Trucks at New York

of the usual nose of the hand truck permits getting the heavy rolls on to the truck without damaging the edge of the roll. Damage of this character is a frequent source of trouble in handling this class of cargo, when the manufacturers do not provide a board or other protection on the ends of the rolls.

The trucks are 5 feet long and 2 feet and ½ inch wide. The main wheels are 10¾ inches in diameter, the rear wheel is 7⅜ inches in diameter. Roller bearings are provided in the trucks recently constructed. The trucks were manufactured in the shops of the Power River company. The scoop is patented by the Scoop Truck, Ltd.

Portable elevators or stackers are used for loading rolls of newsprint paper weighing up to thirteen hundred pounds, on motor trucks at the New York Central newsprint piers in New York harbor. The rolls are brought to the elevators with hand trucks. In front of the platform of the stacker, a small platform is placed. The rolls are pushed over to the platform on two pieces of four by four placed on the platform of the stacker. The roll is then raised by an electric motor to an elevation slightly higher than the floor of the motor truck, so that the rolls are easily pushed on the motor truck. Two pieces of wood are placed under the roll, as the platform rises, and the rolls are pushed down the slanting pieces of wood into the motor truck. Twenty-three rolls can be loaded in three tiers on a motor truck by this method, using two men on the truck and one elevator operator. The smaller motor trucks carry fourteen to fifteen rolls in two tiers. These are loaded in approximately twelve minutes.

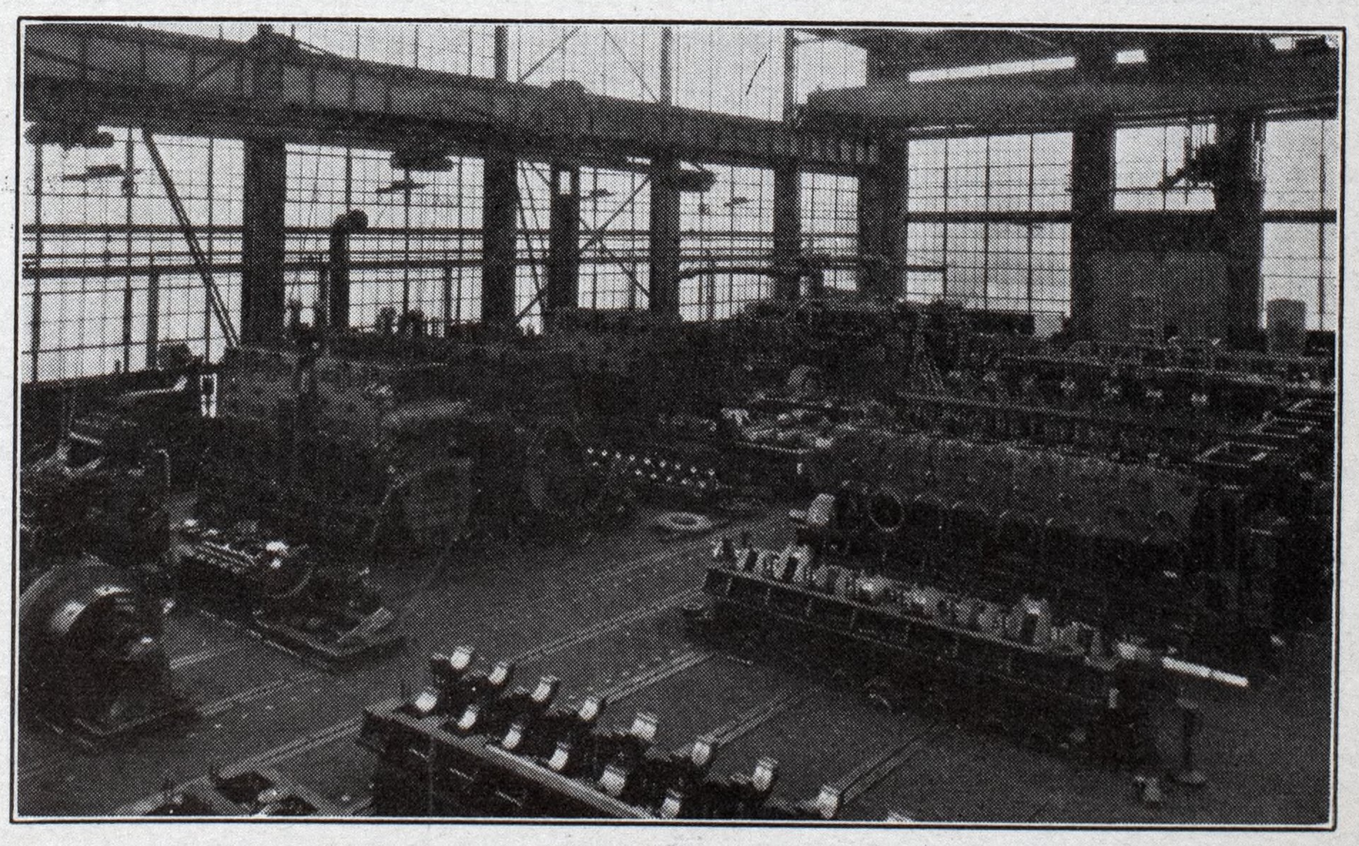
Marine Positions Open

Examinations are to be held for the appointment of local and assistant inspectors of boilers and of hulls for the United States steamboat inspection service. Applications for positions in these capacities must be on file with the civil service commission at Washington not later than March 4. The entrance salary per year for local inspectors is $3200 and for assistant inspectors, $2900. Higher salaried positions are filled through promotion. Complete information may be obtained from the United States civil service commission, Washington.

Diesel Engines in Mass Production

THE diesel engine plant of the Cooper-Bessemer Corp. at Grove City, Pa., is busy keeping up with orders and at the present time there are 38 diesel marine engines on the assembly line. Apparently the recent stock market reversal has had but little effect in the marine field, indicated by a continuance of business in the diesel engine industry.

The accompanying illustration shows a portion of the assembly line on which 38 diesel power plants are in the process of construction. This number is being steadily increased by additional orders for new engines for delivery in 1930.



Insulation Saves Fuel

(*Continued from Page* 37)

portunity to get value received from every dollar invested in the machinery under his care. Figs. 1 and 2 have been prepared to show the difference between the heat lost in a bare pipe and that in a lagged pipe. In all measurements of heat the units used are the British thermal units which pass through a surface in a given time between certain temperatures. As the temperature of saturated steam bears a definite relation to the pressure, this temperature can be expressed in terms of the corresponding pressure. This is desirable, for aboard ship gages are always available whereas thermometers are practically never installed in steam lines. Both figures have been prepared for saturated steam pressures, for different sized pipe lines, using an average temperature of the engineering spaces of 80 degrees Fahr. For practical purposes these conditions are sufficiently accurate. Having found the heat losses from the figures, the difference will give the resulting heat loss between lagged and bare pipe.

Practical Example In Saving

As a practical example to illustrate the economy in operation between a lagged and a bare pipe, it is assumed that an 8-inch pipe 10 feet long carrying saturated steam at 250 pounds per square inch pressure is accepted as the example:

From Fig. 2—(see dotted lines).
B.t.u. loss per hour in 1-foot of bare pipe =2600.
From Fig. 1—(see dotted lines).
B.t.u. loss per hour in same pipe, lagged=244.

Difference for 1 foot (saved) per hour = 2356 B.t.u.
Difference for 10 feet (saved) = 10 x 2356 = 23,560 B.t.u. per hour.

If the boilers are oil fired at 70 per cent efficiency, using fuel oil having, say, 17,000 B.t.u. per pound, then, only 0.70 x 17,000 or 11,900 B.t.u. per pound of oil is available. The heat lost through the bare pipe will be the equivalent of a pound of oil in 30.3 minutes. This lost pound of fuel oil will have to be replaced by an additional pound burned under the boilers. In a day the wasted fuel oil will amount to $\frac{24 \times 60}{30.3} = 47.6$ pounds, while in a month it will rise to 47.6 x 30 = 1428 pounds. Assuming 7.8 pounds of oil to the gallon, the month's wasted fuel will be 183 gallons, and at 42 gallons to the barrel this will amount to 4.36 barrels. With fuel oil costing $1.25 per barrel, the net loss in a month will amount to $5.45, while for a year's operation the loss will amount to $65.40. It costs approximately 25 cents per square foot to cover a pipe with one thickness of lagging. The pipe in question would cost about $5.25. Assuming depreciation charges amounting to even as high as 20 per cent per year, the cost per year for the lagging would only amount to $1.05. The overall saving on the engineering department to lag this one 10-foot section of pipe would amount to the difference between the total saving and the depreciation charges on the lagging material, namely, $65.40 — $1.05, or $64.35. No engineer, operator nor owner can afford to neglect a saving of this size, particularly when the example chosen is only a short section of piping under high pressure steam. Proper insulation is therefore closely related to operating efficiency.

Error Is Corrected

In the article, "Steam or Diesel—A Comparison," which appeared in our November issue, page 62, there is a typographical error in the location of the decimal point in the computations comparing fuel costs per shaft horsepower per hour, for various types of motive power. The computations appear in the first column on page 63 and the results should be in fractions of a cent, that is, for coal-burning reciprocating engine the cost per shaft horsepower per hour should be .437 cent instead of, as erroneously given, 43.7 cents. A similar error has been made in each of the other three computations. In each case the correct answer is of course a fraction of a cent.

From the Editor's Mail

To the Editor:

At the top of page 22 of your January issue is a view of Port McNicoll with a grain fleet of winter storage boats placed for the winter; this was taken approximately 10 years ago.

My reason for bringing this to your attention is that this is erroneously titled "Port of Montreal—Canal Size Grain Freighters waiting to Discharge Grain from Upper Lake Ports." The smallest vessel in view in the picture is 350 feet in length while the most of them are from 450 to 600 feet; a canal size freighter, as you know, is limited to 250 feet in length.

M. McD. Duff

To the Editor:

I was very much interested in the article entitled *Lake Shipping Suffers Heavy Losses*, as given in the issue of MARINE REVIEW for January, 1930 (page 36) and in referring to the famous steamer FRANK E KIRBY, latterly known as the DOVER, you mention the fact that she was the loser in her famous race with the steamer CITY OF ERIE. I was a resident of Detroit at the time this race was run, and it was not with the FRANK E KIRBY, but with the TASHMOO. When the TASHMOO was built, it was said that she would excel all other side-wheelers on the lake in speed, although she did this in many respects, she was not able to overcome the speed made by the CITY OF ERIE.

The FRANK E KIRBY was speedy, and had the engine of the famous steamer ALASKA of the 80's, this having been taken out of the old revenue cutter JOHN SHERMAN when she was dismantled in 1879.

The OWANA was built for the run between Erie and Buffalo, and was called PENNSYLVANIA. She also had the engine of an old United States revenue vessel, this having been taken from the JOHN A DIX, which served for many years after her retirement from the revenue service as an excursion boat on Lake Michigan.

There were two other engines built at the same time as those just mentioned, one for the steamer FESSENDEN, and the other for the revenue steamer ANDY JOHNSON. After many years' service the ANDY JOHNSON was dismantled and her engine placed in the steamer FLORA at Detroit. It only gave a few years' service as she was destroyed by fire in Chicago about thirty years ago. The FESSENDEN'S engine is still in service in the steamer CHIPPEWA whose hull was built in 1883 and which was known for many years as the FESSENDEN. At the time the hull was built it received the engine of the old FESSENDEN, built in 1864.

Frank Pfau

To the Editor:

It may be that the DOVER, as the old FRANK E KIRBY, did at one time race with the CITY OF ERIE, but the most famous race of the latter boat was with the excursion steamer TASHMOO, still running between Detroit and the St. Clair Flats.

E. C. Barringer

British Shipping Gains

(*Continued from Page* 30)

confident in their wares to guarantee an economy of 20 per cent for a year before demanding payment.

American experiments with pulverized fuel in the MERCER, WEST ALSEK, BERWINDGLEN and BERWINDVALE, attracted attention in Britain as soon as they were made, and quite a number of ships have been experimentally fitted, two originally built, with pulverized fuel plant. In every case it has been a success, and those ships which started with only a part of their boiler equipment converted have all since treated the remainder in the same way. Naturally enough numerous minor adjustments have been found necessary, but generally speaking, pulverized fuel has been a success. Certain coal interests feel optimistic that the result of this success will be to restore coal for steam raising to its old position in its competition with oil, but others consider that its general adoption will only lead to cheaper bunker coal being used instead of the more expensive now purchased.

Diesel Installations Are Numerous

Most of these experiments have been tried in the high-speed cargo liners whose number is rapidly increasing, but numerous diesel installations have been put into this type as well. British owners are inclined to keep an open mind as to the relative advantages of diesel machinery and steam, admitting that each possesses points in particular circumstances or on particular routes. In those ships which have been given diesel engines, super-charging has rather suddenly become general, the Blue Funnel line contriving trial speeds of 17 and 18 knots in their new cargo ships by this means, while comparatively few big motor-ships now are being built in Britain without exhaust heat boilers.

The numerous conversions and improvements which have taken place have brought increased business to the repairers, added in the latter part of the year by the prolonged bad weather round the British coast. This repair business is conspicuous for its increased specialization from apprentices upward.

The position has naturally brought up the old question as to whether surplus tonnage should be sold or scrapped, the economists urging the latter course on account of the increased competition from continental firms who can run their ships more cheaply than the British. The question has been intensified by the sharp slump at the end of the year, which laid up a number of ships, and which coincided with an excellent price for scrap steel. But at the same time the market price for second-hand tonnage abroad tended to harden, particularly with the smaller types of ship.

The coasting trade still is suffering from the slump, particularly where the cheaply-run Dutch, Belgian and German motor auxiliaries have been able to find a footing, but there now is a very much more favorable tendency, owing to one of the greatest handicaps of the coasting trade, high port dues, being eased by the benefits of the late government's de-rating scheme being passed on to the shipping industry.

Conditions Generally Are Improved

Altogether, both the shipping and shipbuilding sides realize that British industry is not yet out of the wood, especially with the intentions of the present government still uncertain, but the position is very much better for the latter and more promising for the former.

New District Director Is Appointed

Capt. Elmer E. Crowley, formerly president of the Merchant Fleet Corporation and well known shipping man, returned to the Corporation's office on Jan. 16 as district director, succeeding Capt. W. E. Griffith, retired. Capt. Frank E. Ferris, who was also formerly an official of the Fleet Corporation, was appointed director of operations, effective Jan. 16.

Capt. Crowley has announced the appointment of Frank J. Dennison, head of the stevedoring department in New York, as assistant district director. No appointment will be made to the stevedoring department post.

Capt. Crowley's return to the Fleet Corporation is welcomed by shipping men who appreciate his expert grasp of the intricate problems confronting the American merchant marine. He has held a number of executive positions with steamship companies and is also an experienced sailor, having at one time commanded the world's largest sailing vessel, the THOMAS W. LAWSON.

Delegates Leave for Naval Conference

Members of the American delegation to the London naval conference sailed from New York on the steamer GEORGE WASHINGTON of the United States lines on Jan. 9. The delegation included Henry L. Stimson, secretary of state, and Mrs. Stimson; Charles Francis Adams, secretary of the navy, and Mrs. Adams; Senator and Mrs. David A. Reed; Senator and Mrs. Joseph T. Robinson and Ambassador Dwight W. Morrow, Mrs. Morrow and their daughter, Miss Elizabeth Morrow.

Advisors to the delegation and the naval technical staff included Admiral and Mrs. William V. Pratt, Rear Admiral and Mrs. Hilary P. Jones, Mr. and Mrs. Arthur Wilson Page, J. Theodore Marriner, George Rublee, Rear Admiral and Mrs. J. R. P. Pringle, Rear Admiral William A. Moffett, Rear Admiral and Mrs. H. E. Yarnell, Rear Admiral and Mrs. A. J. Hopburn, Capt. W. W. Smyth, Capt. and Mrs. A. H. Van Keuren, Commander and Mrs. Harold C. Train and Lieut. Campbell.

In addition, the passenger list included 41 names covering the secretariat, press, assistants, navy clerks, stenographers and messengers who will serve the delegation.

Liner Paris Renovated

The popular French line steamer PARIS arrived in New York, Jan. 22, after four months spent in the Penhoet shipyards in St. Nazaire where she was built. During this time she received a most thorough reconditioning throughout, in machinery, structure and appointments. She was redecorated and refurnished throughout and is now virtually a new liner. Maurice Tillier, managing director of the French line arrived on her. He will preside at several social functions which marked the steamer's re-entry into service during her brief stay in New York.

Foreign Fuel Stations

A comprehensive directory of fueling stations has been issued by the shipping board and the department of commerce, describing marine fueling facilities at 300 stations throughout the world. The directory is divided into two parts, one devoted to coal bunkering stations and the other to fuel oil stations. It is interesting to note that the bunkering facilities of the various ports range from 25 tons per hour per hatch at the Chinese and Japanese ports, where coal is handled by coolies who carry it aboard in tubs or baskets, to 700 tons and upward at American ports equipped with mechanical loading devices. Fuel oil is handled in most cases by pipe lines but in some instances delivery can be made only in drums or cases.

Personal Sketches of Marine Men

Henry Herbermann, President, Export Steamship Corp.

By E. C. Kreutzberg



HE IS operating successfully a fleet of 42 American vessels from Atlantic coast ports to the Mediterranean and Black Sea.

EXPERIENCE in handling goods and men, and an original outlook have helped him to solve many difficult shipping problems.

HE CONTRIBUTED much of his experience and personality to the congressional hearings leading to the promulgation of the Jones-White Law.

NINE years ago, Henry Herbermann first became actively connected with the business of operating ships. In April, 1920, he purchased the Export Steamship Corp., then unsuccessfully operating a fleet of six vessels. Today, as president of this corporation, he owns and operates a fleet of 42 combination passenger and freight vessels from North Atlantic ports to Mediterranean and Black Sea ports.

His will to win showed up early in life. He was born in Jersey City, N. J., in 1878 of a family in moderate circumstances, left school of his own volition at the age of ten and started to work as call boy for the Pennsylvania railroad. At that time there was no telephone, and it was the boy's duty to trudge around and notify the members of train crews what time to report for work. He was, successively, messenger boy, freight handler, fireman, checker, receiving clerk, foreman and then general foreman. In the latter capacity he had charge of all the Pennsylvania railroad's terminal facilities in Jersey City, N. J. Realizing even at this early age, the unlimited possibilities for improvement and development in the transportation field he resigned from the railroad in 1912 and, obtaining financial backing, organized a lighterage business, later on also organizing a trucking company. As his war contribution, Mr. Herbermann stuck to a decision not to raise his rates during the war, and as a result his venture went into bankruptcy. After the war, he went into a warehouse venture in New York and, by effecting economies and introducing efficient methods of operation, he was able to reduce warehouse charges from 25 cents to 2½ cents per 100 pounds, and still make enough money to enable him to pay in full all the outstanding obligations of his lighterage and trucking company which had failed.

In the days of his trucking activities, Mr. Herbermann achieved the unique reputation of "emergency engineer," gaining prominence by his ingenuity in performing seemingly impossible tasks. He did spectacular work in hauling huge structural members for the Pennsylvania terminal, the Park avenue viaduct, the Municipal, Trinity and Woolworth buildings. On one occasion the feat of releasing a single car out of a heavy congestion in one of the railroad yards was successfully accomplished through the use of a derrick which raised the car clear of the "tangle" and permitted its immediate delivery. At another time, when no one at Garden City could solve the probem of delivering airplanes intact at army bases, Mr. Herbermann effected the delivery of a number of planes within 72 hours.

An exploit which gained for him great popular acclaim, and the title of "the man who never failed" was the transportation of the gigantic German submarine through New York's congested streets to Central Park, where its deck was to serve as a platform for orators during the Liberty Loan campaign. This proved to be one of the biggest moving jobs in the history of New York; after he had loaded it on wheels, he hitched a team of 48 horses to it and as it was impossible to drive a team of this magnitude, himself led the horses. On account of New York's solicitude for its remaining trees, Mr. Herbermann placed men along the route who held back the branches while the submarine went by. His anticipation of the minute details even led to the placing of farriers along the route and when two of the horses lost their shoes they were promptly replaced. The trip was made without any damage excepting that a few

manhole covers were broken, and the pavement sagged at a few points.

This same driving force behind the Export Steamship Corp. has been the cause of its success. Trade routes have been extended and standardized until the export tonnage out of the port of New York exceeds that of any other single company. Another of his achievements was the signing of a contract with Am-Derutra Transport Corp. for full cargoes from New York to Russian Black sea ports and the establishment of the first regular schedule between the United States and Russia since the World war. All of this tonnage was previously carried in foreign flag bottoms. This contract is unique in that it is the largest individual freight contract ever booked by an American firm and this will tend to bring about a closer national relationship between the two countries. In addition the Export Steamship company has placed the largest single order for new vessels ever awarded in this country in peace time. The New York Shipbuilding Co. has been given a contract for six 10,000-ton vessels to the highest classification of the American Bureau of Shipping.

In directing the development of his line, Mr. Herbermann has been actuated to a large extent by his background of experience in all forms of transportation. This experience led him, several years ago, to advocate facilities which will permit ships to load direct from cars, and unload directly into cars or warehouses and as soon as the Pennsylvania railroad's gigantic new warehouse terminal on the Jersey City waterfront is completed, the vessels of the Export Steamship Corp. will use these modern facilities and will discharge their cargoes directly to cars or warehouse.

As an illustration of the saving to be made in this manner may be cited the example of a certain shipment of cherries in brine, from Genoa to Philadelphia, by the way of New York. The steamer collected $4.94 and, after paying 89 cents to the European agents and forwarders, had $4.05 left to cover the haulage of the shipment 4075 nautical miles to pier in Brooklyn, N. Y. Drayage from the pier to the railroad terminal cost $2.69. The railroad freight to Philadelphia was $6.38, and the drayage at Philadelphia to the consumer's store cost $2.69. In the above expenses the Brooklyn drayage item of $2.69 would be eliminated by direct handling between ships and railroad cars. This direct handling also would eliminate a great deal of expense now occasioned by lighterage charges.

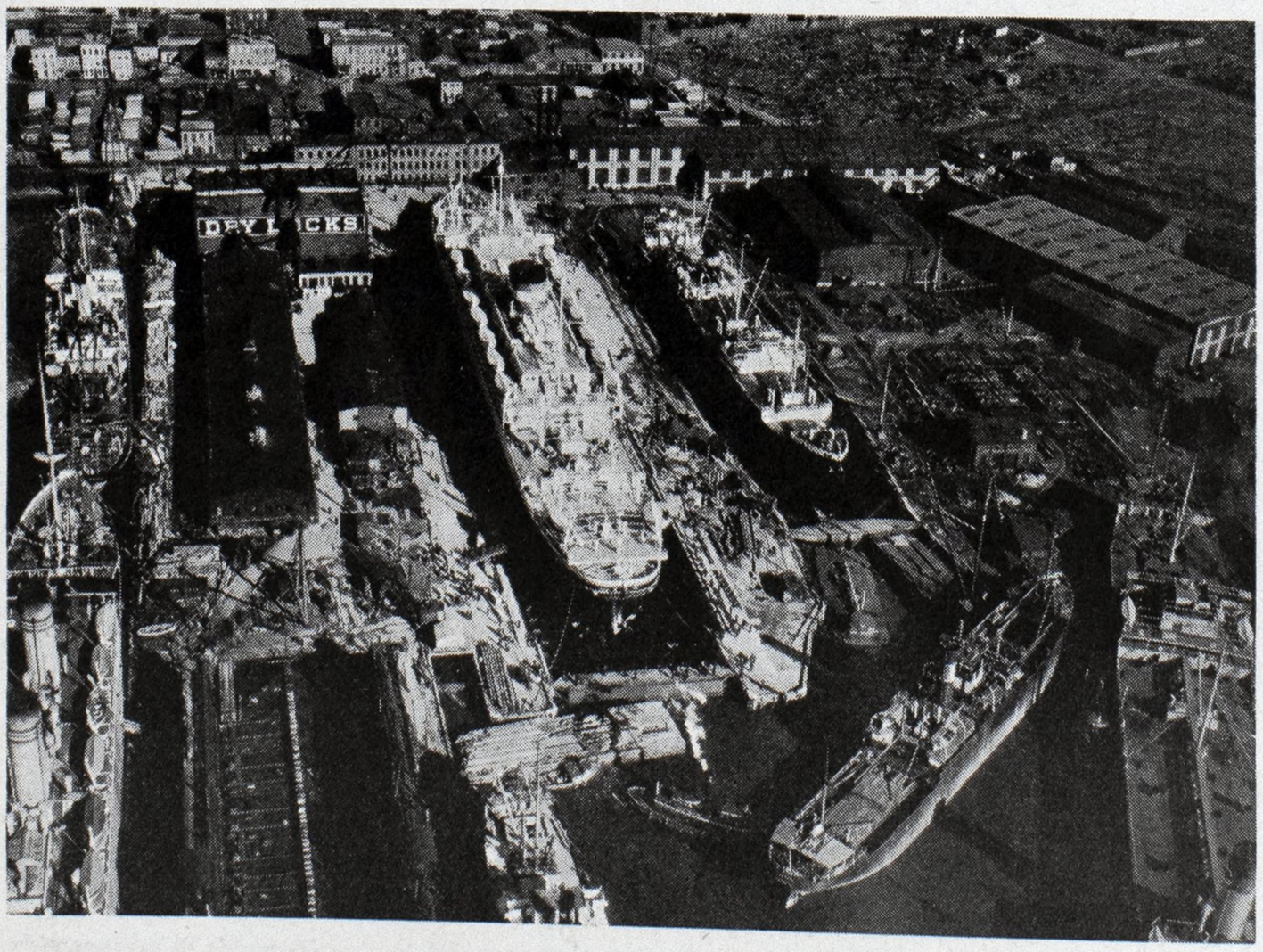
Mr. Herbermann was quick to realize the importance of healthy crews aboard his vessels and his was the first company to create a medical department in order to bring this about. The results have more than justified the experiment. He further formed safety committees composed of heads of the various departments on shore and aboard his vessels. These committees receive recommendations for safety and health made by any member of the entire organization ashore or afloat. The resulting decrease in the number of accident and illness cases is marked.

He further instituted a plan for the most efficient vessel as to its performance and has awarded yearly bonuses to the officers and crews, of the vessel having the highest efficiency rating. A bonus is also paid to the crew having the least number of accidents and illnesses during the year. In addition to the financial saving it has created a spirit of friendly rivalry among the personnel and has built up a fine esprit de corps.

Even prior to the passage of the merchant marine act of 1928 Mr. Herbermann had set about Americanizing his personnel and had already inaugurated a system for training young American boys between 18 and 21 years of age for future officers in the American merchant marine. Quite a number of these cadets have passed examination and are serving as deck officers and engineer officers in his company.

Another interesting feature for the building up of good will for this company is the making of motion pictures portraying the industrial activities and cargo handling facilities of the various ports of call and something of the social lives of the inhabitants.

Largest Vessel Drydocked in New York Harbor



THE Cosulich line's motorship SATURNIA *entered the new Todd dock in Brooklyn, Jan. 6 for inspection prior to departure on a cruise to the Mediterranean. The* SATURNIA, *which has a displacement of 35,000 tons, is the largest vessel ever drydocked in New York harbor. Her sister ship, the* VULCANIA, *was drydocked some time ago in the Navy yard but it was necessary to slice off 20 feet from the tops of her masts to enable her to pass under the Brooklyn bridge. The new Todd graving dock, however, is fifty feet longer than any in the Navy yard and vessels requiring docking for inspection or repair will no longer have to pass under the bridge.*

The SATURNIA, *is 637 feet in length, 80 feet wide with a depth to the flying bridge of 92 feet. This will be the sixtieth ship that Capt. Ruberto Stuperich, the* SATURNIA'S *commander, has taken into the Robins drydocks during the last thirty years.*

M. S. City of New York

(*Continued from Page* 26)

wick-Kroeschell equipment includes facilities for producing 132 pounds of ice daily, as well as cooling the ship's drinking water supply.

In the cooling system are two marine type double pipe condensers, 1 horizontal receiver, 1 insulated marine type ice-making set, with a capacity for making 132 pounds ice daily and 1 scuttle but with an 85 gallon capacity. The various refrigerators are equipped with sufficient coils to maintain the temperatures listed above. The 5000 feet of refrigerated space is insulated with 6 inches of cork, wood and metal covered installed with care and accuracy.

Modern Navigating Equipment

This modern vessel is equipped with a fathometer for automatic visual echo soundings. This device consists of three distinct parts; a fathometer indicator with an accompanying amplifier and oscillator and a hydrophone. The indicator controls the emission of sounds from the oscillator, receives the electrical impulses produced by the impact of the returning sound echo upon the hydrophone and registers the depth by flashes of light on the dial by translating the time interval between the emission of the sound and the reception of the echo. The amplifier steps up the impulses to a strength sufficient to flash the red light on the dial. The oscillator must produce a sound of great intensity for a small fraction of a second. The hydrophone is housed in a water filled tank mounted on the inside of the ship's skin, and is a very sensitive sound detecting device. This fathometer of the usual commercial type is able to record soundings in a range between 3 and 130 fathoms, regardless of the speed or weather. It was made by the Submarine Signal Corp.

Besides the Lord Kelvin standard compass, there is a 9-inch Ritchie compass for the wheelhouse and a 7-inch Ritchie compass aft.

Both a gyroscopic compass and a "metal mike" have been furnished by the Sperry Gyroscope Co. The gyrocompass has three repeaters and the "metal mike" has complete hand and automatic steering and telemotor control.

Caulked Oregon pine is used for the outside decking on the bridge deck, after upper deck, boat deck, and navigating bridge. There are three 24-foot Welin metallic lifeboats, one 26-foot motorboat, and one 16-foot work boat all under patent mechanical Welin davits.

The topping lifts are of cast steel standard hoisting wire rope, which with the cargo fall gear are fitted with self lubricating metaline blocks, with extra heavy non-drop lead blocks.

The air whistle is of the Tyfon type using compressed air from the tanks.

The vessel is equipped with the latest type of radio telegraph apparatus and radio direction finder as manufactured and supplied by the Radio-marine Corp. of America. The transmitter is designed for reliable service at ranges up to 1000 miles. It is of the vacuum type operating on interrupted continuous waves. Due to its high efficiency, the load on the ship's dynamo is very light. A special "break-in" system has been built in this transmitter, making it unnecessary to use a hand operated antenna switch, which feature provides more expeditious handling of traffic. The power for the antenna is between 500 and 750 watts for continuous wave. The wave length range is from 600 to 800 meters and 1800 to 2400 meters. The tubes are of the new thoriated filament. Instead of one or two large tubes, there is a number of small tubes for use of varied power and allowing use of low plate voltage. This equipment operates on a direct current of 115 volts, which drives a three horsepower motor connected to a 1000-volt generator; the full load current is about 25 amperes. The complete installation consists of a transmitter, operator's control unit, motor generator and key.

That modern aid to navigation, the radio compass, is of the outside loop type usually found on all American vessels. Between the loop and the indicator, which consists of a dumb compass card, is a novel form of mechanical compensator automatically correcting the errors due to metal objects about the ship. This compensator may correct for variations up to 20 degrees in every quadrant. The receiver-amplifier is of the superheterodyne type. The wave length range of the receiver is between 550 and 1050 meters. Since the ship's antenna must be open to take bearings, a positive interlock is provided between the radio compass and the switch in the wireless room with a signal light. This apparatus is very compact and weighs complete 355 pounds.

Attractive Lighting Fixtures

The lighting fixtures reflect the careful planning and attractive interior decorative scheme which characterize every portion of the CITY OF NEW YORK. The fixtures are entirely of bronze and brass metal, finished in specially selected tones to harmonize with other interior fittings, and of designs carefully chosen to suit their various positions on board.

Special care was exercised with regard to elimination of light striations, and in the case of enclosing glass forms to insure even distribution. Sustaining screws wherever possible are non-removable and every care has been exercised to the end that they may afford continuous satisfactory service.

Lacquer used was of a special formula, employed in an endeavor to resist corrosion in the sea air. The lighting fixtures were manufactured by Cox, Nostrand & Gunnison, well-known designers, illuminating engineers and manufacturers.

Fine Passenger Accommodations

The CITY OF NEW YORK has three passenger decks with broad passage ways. The main deck is taken up with passengers' staterooms and public and private bath and lavatory accommodations. On this same deck is the dining room and the serving pantry which is directly above the gallery or kitchen. The cold storage rooms are on the deck below and adjoin the kitchen. Passenger staterooms, which are tastefully furnished, have every modern convenience. Each room, besides having two large portholes, an electric fan and steam heat, has running water and automatic ventilation. Thus, the passenger's comfort is provided for against winter cold and summer heat.

Rooms with private bath and toilet have a bed and folding Pullman berth. Rooms without private bath have two beds and a folding Pullman berth, when not in use, can be conveniently folded up, out of the way.

The dining room is a bright cheerful room extending across the width of the ship. The tables are arranged to seat individual parties of from two to four persons. The walls are paneled and the floor is tiled in two tones of buff. The serving pantry, like the kitchen on the deck below, has every modern appliance.

In the kitchen are found an electric bake oven, an electric broiler, an electric griddle, dough mixer, and other modern electric appliances for the handling and preparation of food, such as might be found in any new hotel.

Electric refrigerating machinery is used and more than ample cold storage space has been provided. To insure the proper preservation of foods, separate cold storage rooms have been provided for dairy products, for fish, and for meats and vegetables.

On the promenade deck are the public accommodations, consisting of a lounge-library, and a club-smoking room. The lounge-library, which is

furnished with comfortable divans, easy chairs and writing tables, is paneled and carpeted in two tones of buff. While two different but harmonious shades of buff are used, the general color scheme is similar to that of the dining room on the deck below. A broad staircase, opening directly into the lounge, conveniently connects this room with the dining room and the passengers' staterooms on the deck below. The library consists of a most complete collection of South African, as well as contemporary literature and reference books.

Musical entertainment will be provided by a piano, a victrola and a radio. While en route to and from South Africa, by means of the radio passengers will be able to enjoy, American programs broadcast on short wave lengths. The ship's wireless will receive the press news of the world daily and this together with the "local news" will be published daily.

The club-smoking room, which is finished in oak, resembles the room of an English club or tavern. The lighting fixtures are of bronze, the hangings are in a striped red and mauve, the upholstered furniture is finished in red leather. Adjoining the smoking room is a complete service bar, a barber shop and public lavatories.

The promenade deck is unequaled in size by any ship carrying an equal number of passengers. Although that part of the promenade deck which is outside the lounge can, in rainy or windy weather, be protected, being glass enclosed by Kearfott windows. In addition to the usual deck chairs, this portion of the promenade deck will be furnished with wicker chairs and tables. The large awning-covered deck above will be devoted principally to sports. Here are found deck tennis court, shuffleboard alleys, and ample space for quoits and other deck games. A feature of the outdoor activity facilities is a large open air swimming tank.

There is a laundry, electrically equipped, to care for the passengers' linen, also a shop where passengers may purchase toilet articles and novelties.

New French Line Vessels

Contract has been let for the construction of six additional steamers for the French line, to be entered into the North Pacific trade, according to despatches reaching H. S. Scott, president of the General Steamship Corp., Pacific coast agents for the line. These vessels will be named SAN PEDRO, SAN DIEGO, SAN FRANCISCO, SAN JOSE, SAN MATEO and SAN ANTONIO, and are expected to be ready to enter into active service toward the end of 1930.

The vessels will follow the new passenger and freight ships which are now entering into the trade, viz: motorship OREGON, motorship WASHINGTON, steamship WYOMING and steamship WISCONSIN. This makes in all a total of ten new vessels to be ready for the French line service in the course of the next year. In addition, the former steamship JACQUES CARTIER has been reconditioned.

Build Porto Rico Liner

(*Continued from Page* 51)

new 16-knot steamer for the New York and Porto Rico line at the Fore River plant of the Bethlehem Shipbuilding Corp.

This new vessel, for the service from New York to Porto Rico will cost approximately $3,000,000 and will be 429 feet long, 59 feet 6 inches in beam and will have a gross tonnage of 7000. Accommodations of the finest type will be provided for 357 passengers, of which 261 are in first class and 96 in the second class. The new liner will be somewhat larger and in other respects an improvement on the COAMO, which is also a new vessel, having been completed only three years ago. Geared turbine drive will be the motive power.

Modern facilities will be provided for handling cargo. In order to carry citrus fruits and other perishable and semi-perishable products cargo spaces are to be especially refrigerated. With the COAMO, the new vessel will give a weekly service to Porto Rico, while a third vessel now in operation in this service will provide a semi-weekly schedule. This ship, as well as the two elaborate Ward liners, is from the design of Theodore E. Ferris, New York naval architect. Mr. Ferris will also supervise construction.

Capt. Edwin Cleak Wakeman has been appointed commodore of the Royal Mail Steam Packet Co.'s fleet, effective Jan. 1, it has been announced.

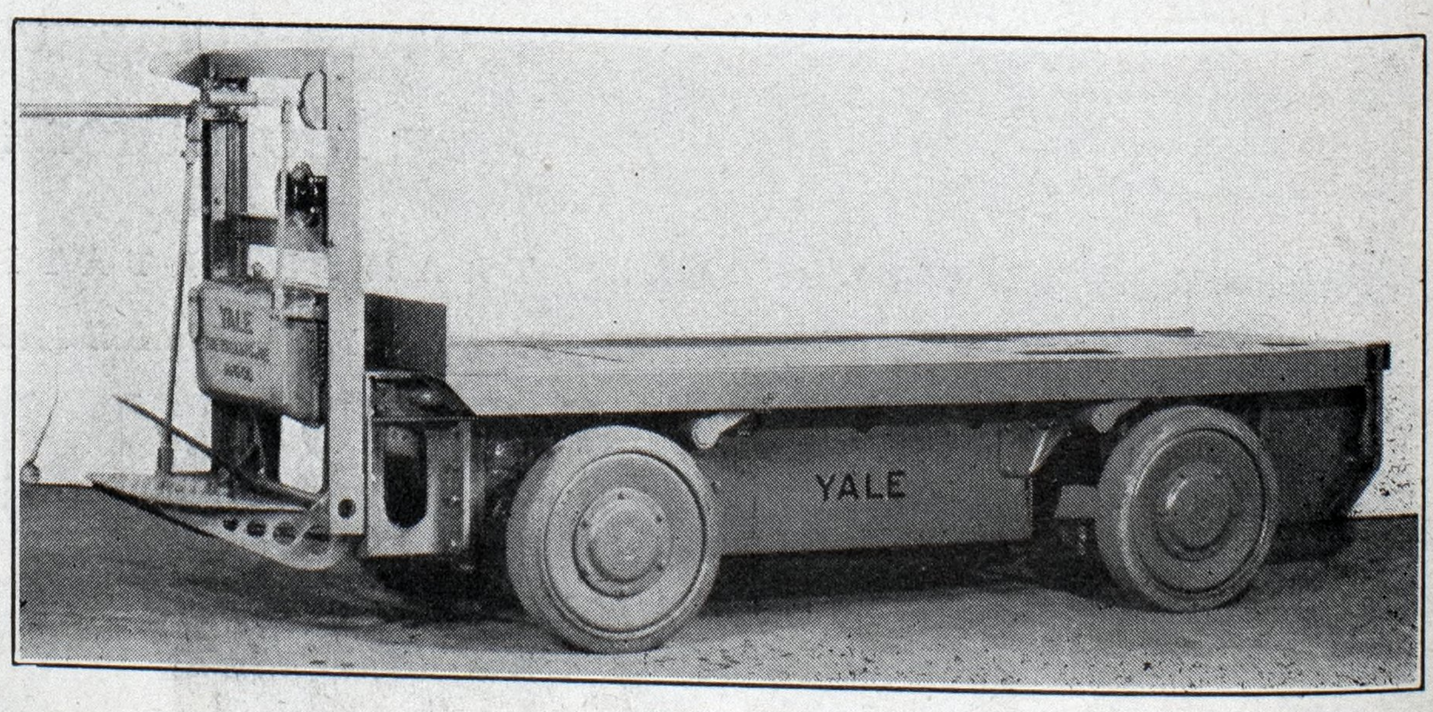
Electric Lift Truck for the Marine Terminal

THE Yale and Towne Mfg. Co., Stamford, Conn., manufacture a lift truck which combines the large skid platform area of forty cubic feet with a turning radius of 7 feet 8 inches for the outside edge of the truck. The rated weight capacity is 6000 pounds. It has a speed of 5.5 miles per hour empty, when running on level concrete. Speed when loaded is 3.9 miles per hour. The loaded truck accelerates up to full speed in sixty feet.

The high platform, some 24⅝ inches in the low position, permits the use of 20-inch by 5-inch tires on all four wheels, an important feature in dock operations where trucks often operate over poor roadways. The chassis is suspended on four helical coil springs which protect both the truck and the load from the pounding effect of bad surfaces.

The platform lift is four inches and the lifting time is 4½ seconds when loaded.

Power is supplied by a 15 MVA 15 Exide iron clad battery or a 24 AC Edison battery. Power is delivered to the two rear wheels by a motor driving through a standard Yale spur gear drive. The underslung position of the battery beneath the load platform with its low center of gravity gives stability that is very desirable when the truck is driven over steep inclines or ramps.



Patents Show Marine Development

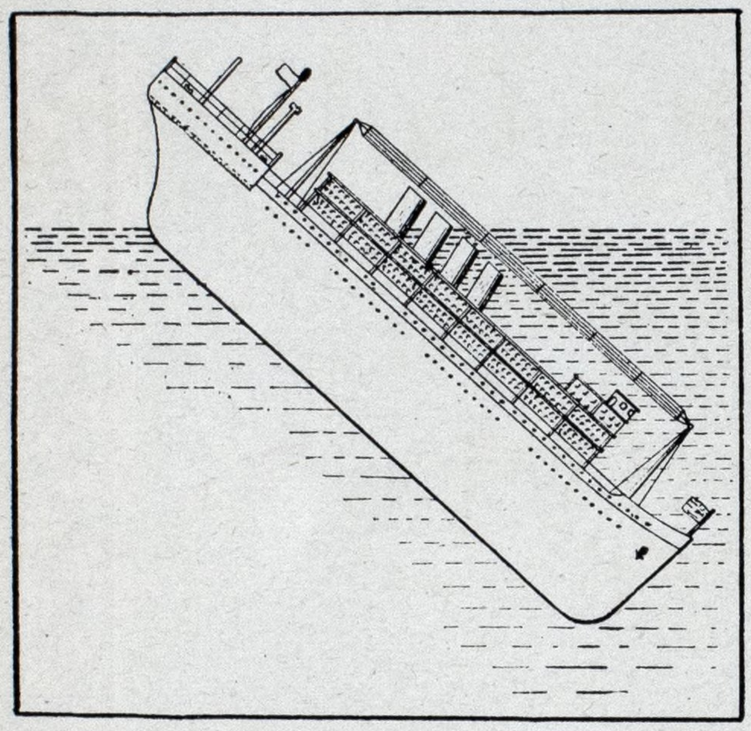
Latest Marine Inventions Described

Specially Prepared for Marine Review

By Richards and Geier

Patent Attorneys, 274 Madison Avenue, New York

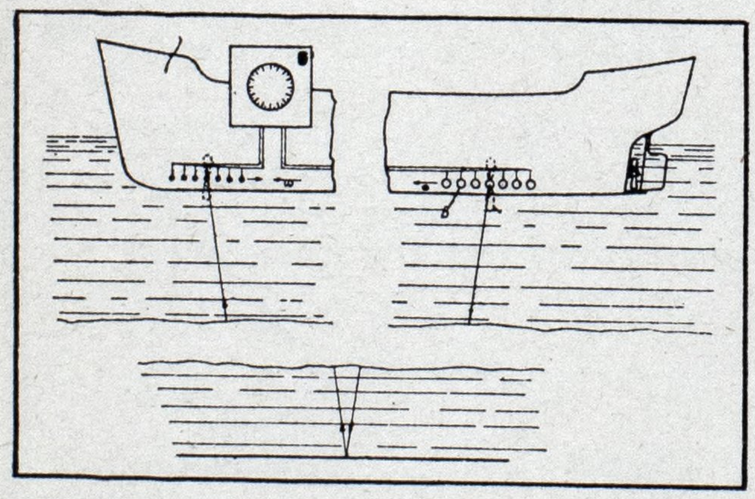
THIS invention relates to certain new and useful improvements in life saving devices for ships, submarines and the like and has for its primary object to provide a cabin section or compartment detachably connected to the boat to be separated therefrom for floating on the surface of the water when the boat is submerged.



LIFE-SAVING DEVICE FOR SHIPS

United States Patent No. 1,730,134, issued Oct. 1, 1929, to Nicola Grabich, of West New York, New Jersey.

THE present application deals with the arrangement of receiving and sending means upon a vessel for the express purpose of determining depths of water.



METHOD AND ARRANGEMENT OF DIRECTIONAL WAVE RECEPTION AND EMISSION

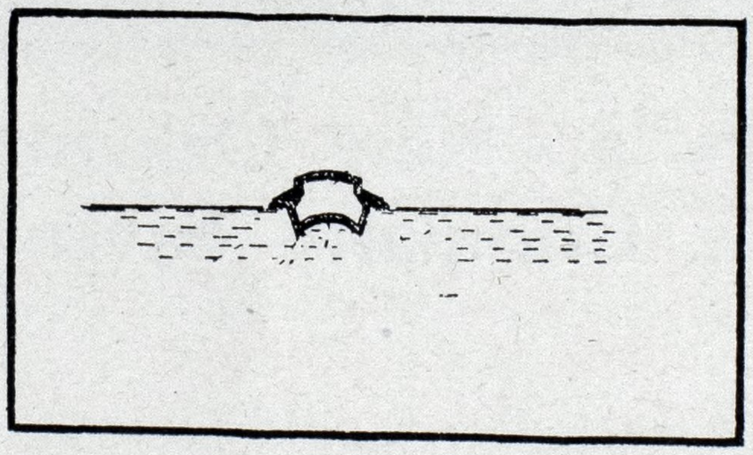
United States Patent No. 1,735,460, issued Nov. 12, 1929, to Walter Hahnemann, of Kitzeberg, near Kiel, and Heinrich Hecht and Bernhard Nielsen, of Kiel, Germany.

ONE of the objects of this invention is to reduce the impact or concussion between a float and the water surface when a seaplane alights on such a water surface.

Another object is to provide a float with a flat boat bottom embodying keel-like edges.

Another object is to provide keels along the opposite longitudinal sides of a float bottom with the bottom hollowed to form two distinctly shaped keels in the bottom of the float.

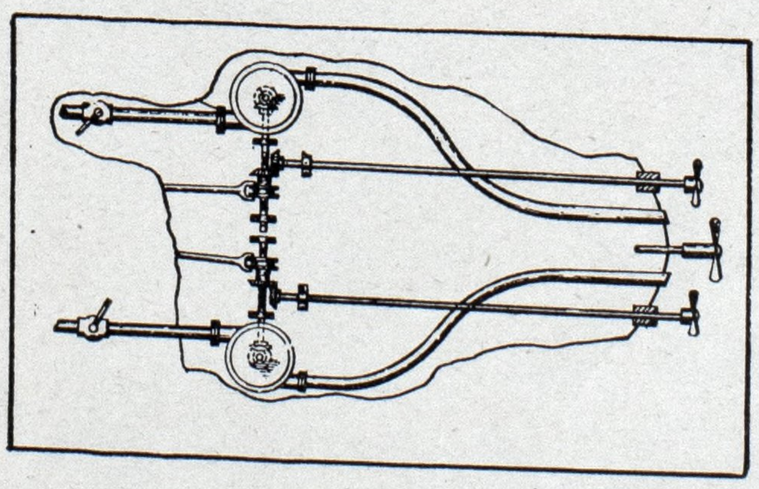
WE HAVE made arrangements with the patent attorneys, Richards & Geier to publish data relating to letters patent issued in the United States covering inventions which may be of particular interest to our readers. The patents described, some of which have accompanying cuts partially illustrating the inventions, are all of recent date and we are planning, in subsequent issues, to publish similar information on patents pertaining to various phases of marine development work. Should our readers be interested in obtaining a printed copy of any of the patents appearing in this issue, or any other patent desired, such copies may be had by addressing request to the editor or direct to the contributors of this page.



SEAPLANE FLOAT

United States Patent No. 1,728,609, issued Sept. 17, 1929, to Carl D. Holler, of Seattle, Wash.

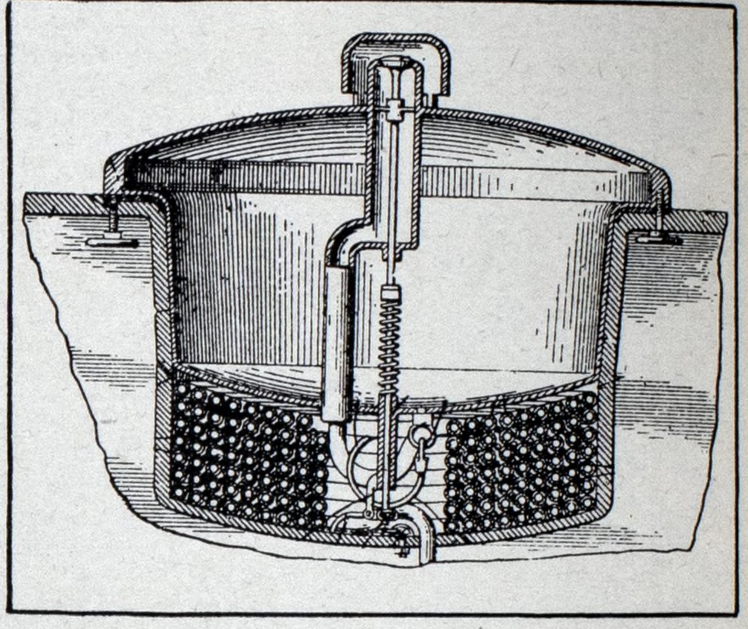
THIS invention relates to a new and useful device in the nature of a marine turbine control device especially adapted for use in power driven vessels, steamships and the like for the purpose of providing auxiliary power for steering.



MARINE TURBINE

United States Patent No. 1,735,641, issued Nov. 12, 1920 to Isidro Garcia, of Buenos Aires, Argentina.

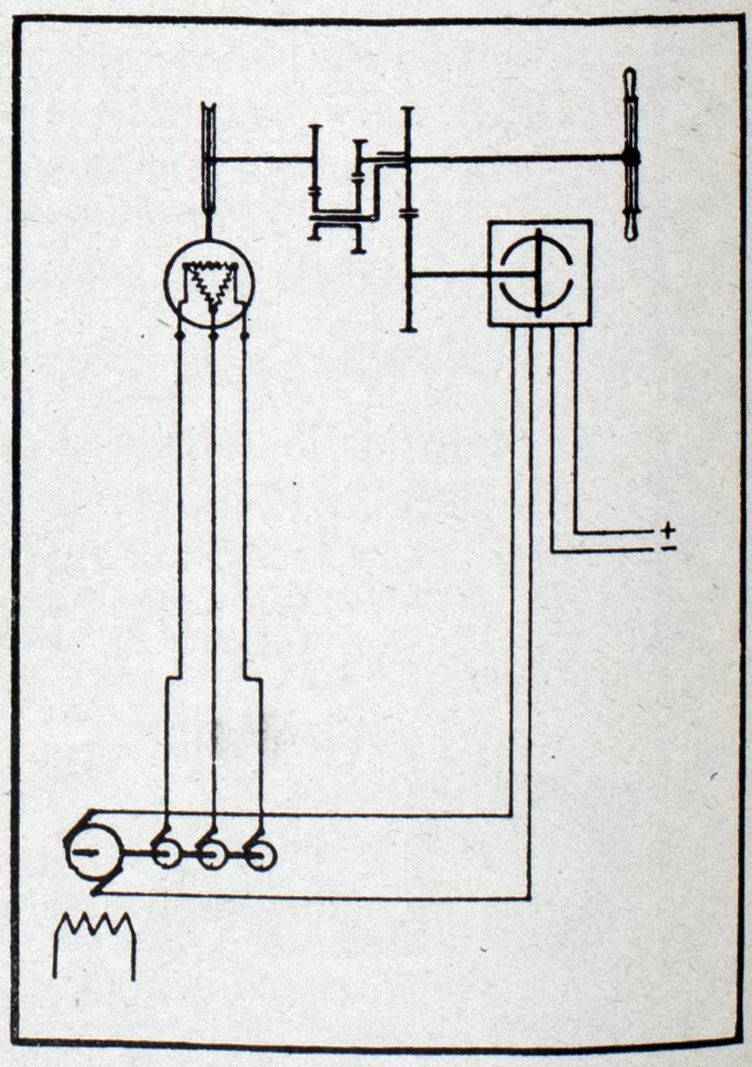
THIS invention relates to improvements in an air supply buoy detachably connected to the shell of a submarine and arranged to be released to carry a flexible air connection to the surface of the water.



AIR-SUPPLY BUOY FOR SUBMARINES

United States Patent No. 1,729,666, issued Oct. 1, 1929, to Arthur R. Slater, of Santa Cruz, Calif.

THIS invention relates to improvements in electric steering gear for ships and involves the combination with a driving motor and a hand-wheel; of a dynamo-electric machine disposed to receive power from said driving motor, a differential gear device having parts respectively driven by said machine and said hand-wheel, and means actuated by the differential gear device.



ELECTRIC STEERING GEAR FOR SHIPS

United States Patent No. 1,729,869, issued Oct. 1, 1929, to Robert Elsasser, of Berlin-Charlottenburg, Germany.

Marine Review
Reg U.S. Pat. Off.
The National Publication Covering the Business of Transportation by Water
February, 1930

Within the Port of New York

ROUNDING out a Service that, in some of its several Units, has served the Port of New York since 1860, Todd, with facilities and equipment that has more than kept pace with the needs of the Port, now brings to marine owners and operators, at its Robins plant in Erie Basin, the largest Dry Dock in the Harbor, capable of handling vessels up to 731 feet in length.

The all-complete Service of Todd embraces every phase of marine work in all operations effecting repair, conversion and reconditioning.

Todd Service is always available—day or night

TODD SHIPYARDS CORPORATION
25 Broadway, New York



M. S. Saturnia in the new Todd dock

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Todd Shipbuilding & Dry Dock Co. Incorporated
Mobile, Ala.
Todd Engineering Dry Dock & Repair Co.
New Orleans, La.
Todd Dry Docks, Inc.
Harbor Island, Seattle, Wash.
Todd Oil Burners, Ltd.
London, England



24 Floating Dry Docks
2 Graving Docks
3 Shipways

Todd Fuel Oil Burning Systems

Todd Unit System of Burning Pulverized Fuel

TODD NEW YORK, U.S.A.

LARGEST DRY DOCK IN NEW YORK HARBOR



When the Roll is Called

Most of the new American-built ships will be present with some Columbian *Tape-Marked* Rope and many will be completely equipped.

There is a preference for Columbian, the Guaranteed Rope, because in practical usage it gives an extra measure of service.

In order to obtain this result, the manufacturer builds extra service into the rope, longer life, greater strength and durability. This is possible because of Columbian's enormous facilities such as control of the pick of manila fibre by Columbian fibre men in the Philippines, the world's most modern cordage mills and vast manufacturing resources.

Utilizing all these facilities to the best advantage in making the famous Columbian *Tape-Marked* Rope assures users of a line that is not excelled. In fact it leads in its waterproofing feature, its strength, durability and flexibility, wet or dry. Put a coil of Columbian to work along side any other line. It welcomes any comparative test.

Columbian Rope Company
332-390 Genesee Street
Auburn, N. Y., "*The Cordage City*"

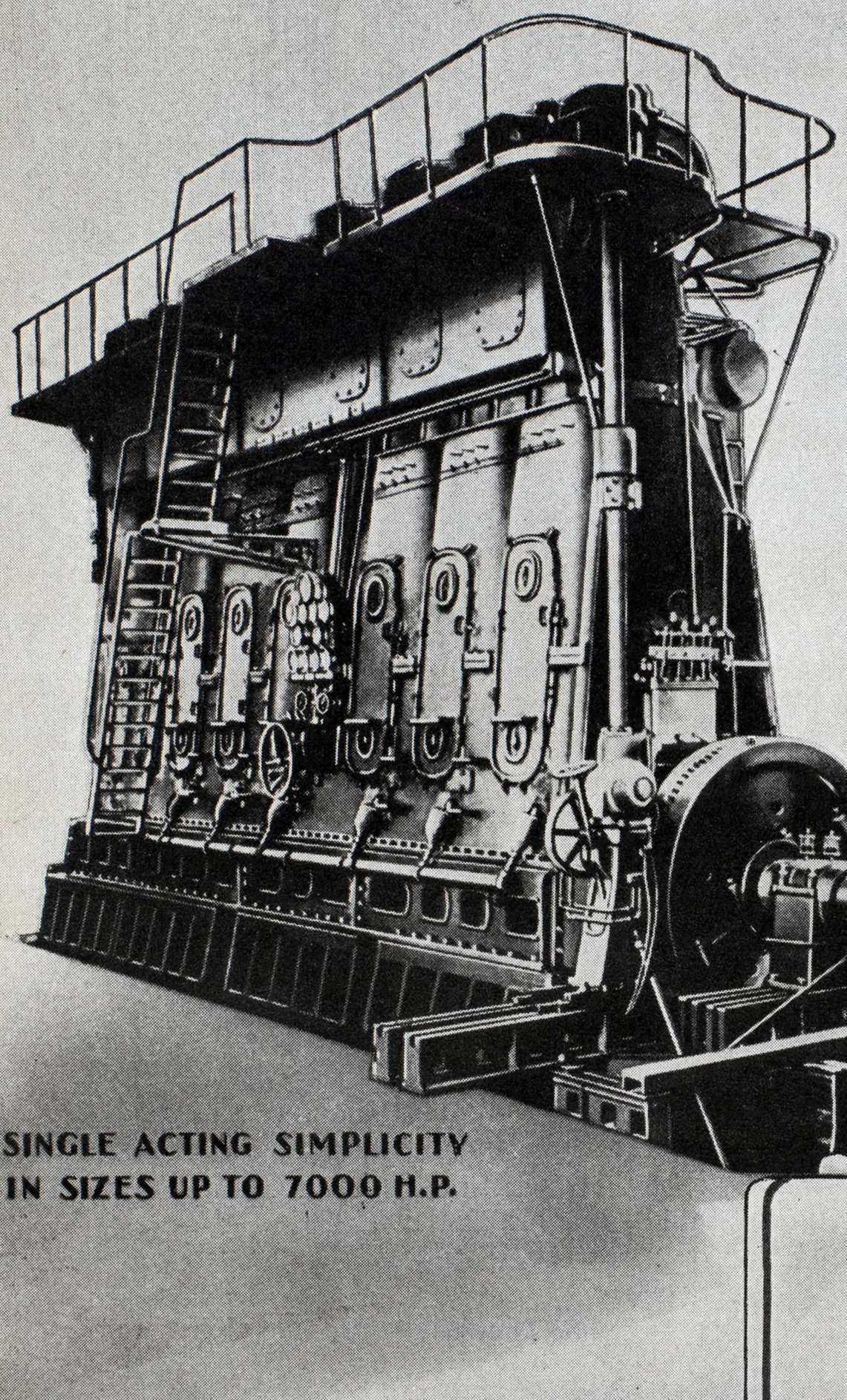
Branches:— New York Chicago Boston New Orleans Philadelphia

COLUMBIAN TAPE-MARKED PURE MANILA ROPE

Vol. 60, No. 2, February, 1930, issue of MARINE REVIEW, published monthly at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3.00 a year in U. S.; Canada, $4.00; Great Britain, £1; single copies, 35c.

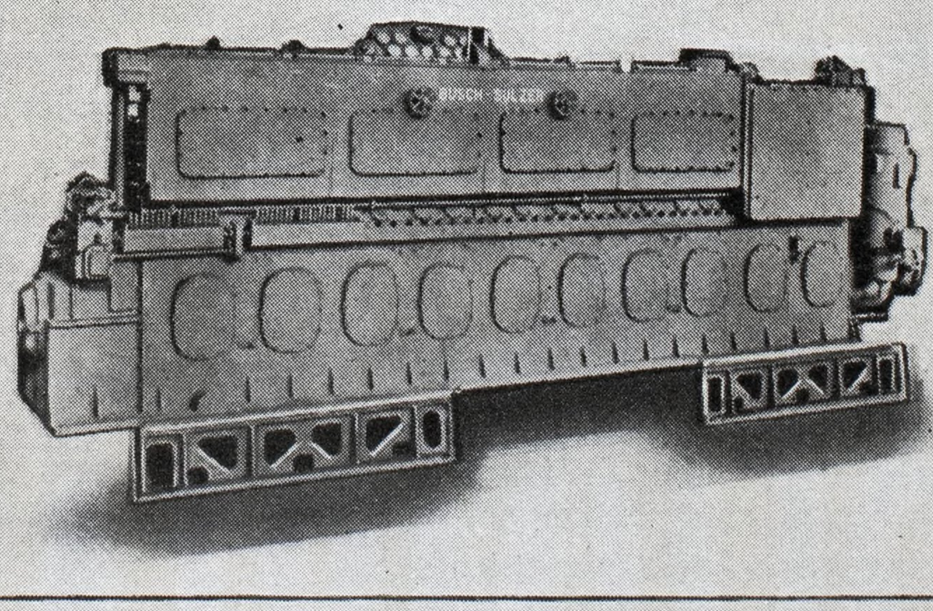
BUSCH-SULZER

TWO-CYCLE DIESEL MARINE ENGINES



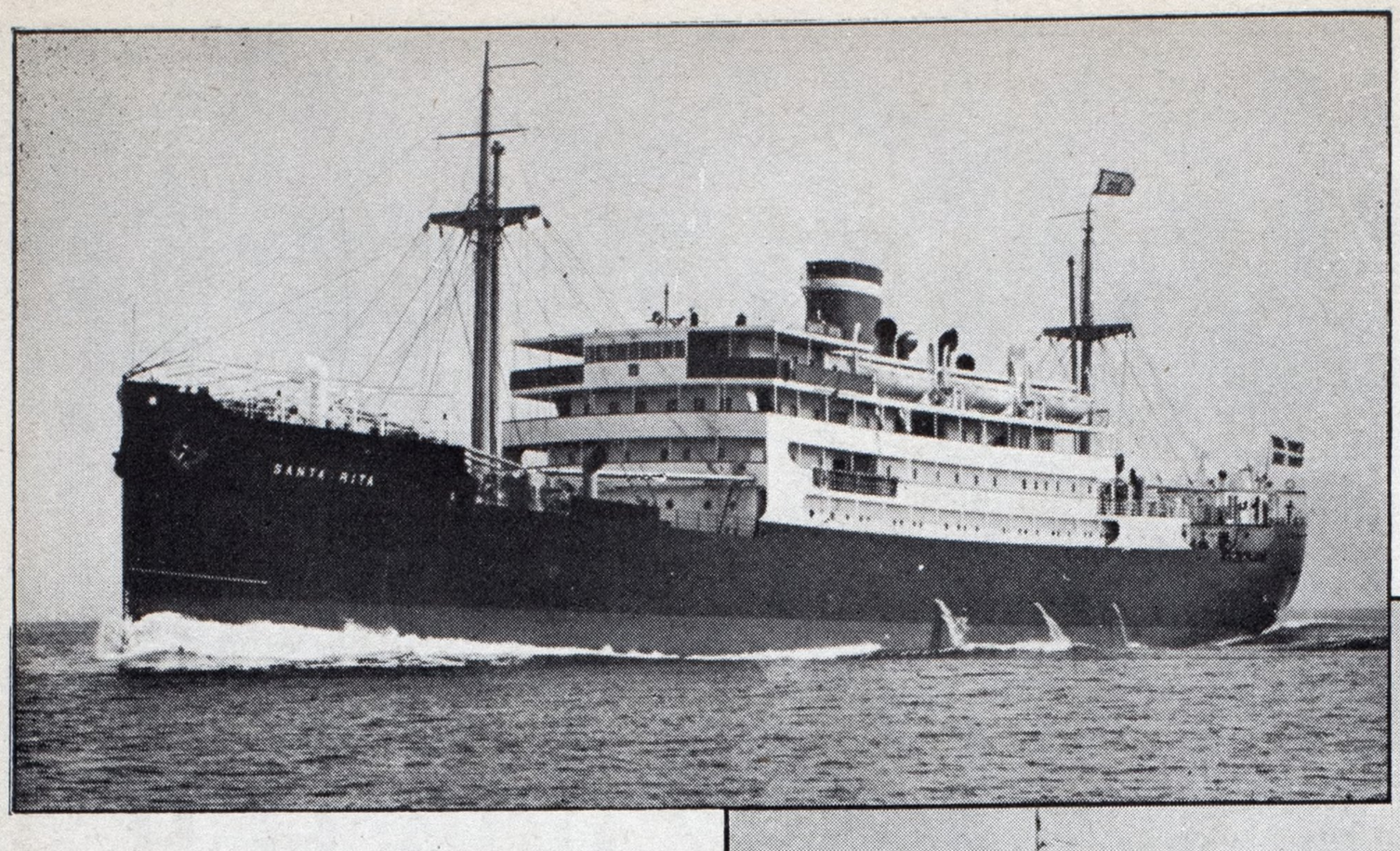
592,000 H.P. of Sulzer Type Marine Diesels ON ORDER

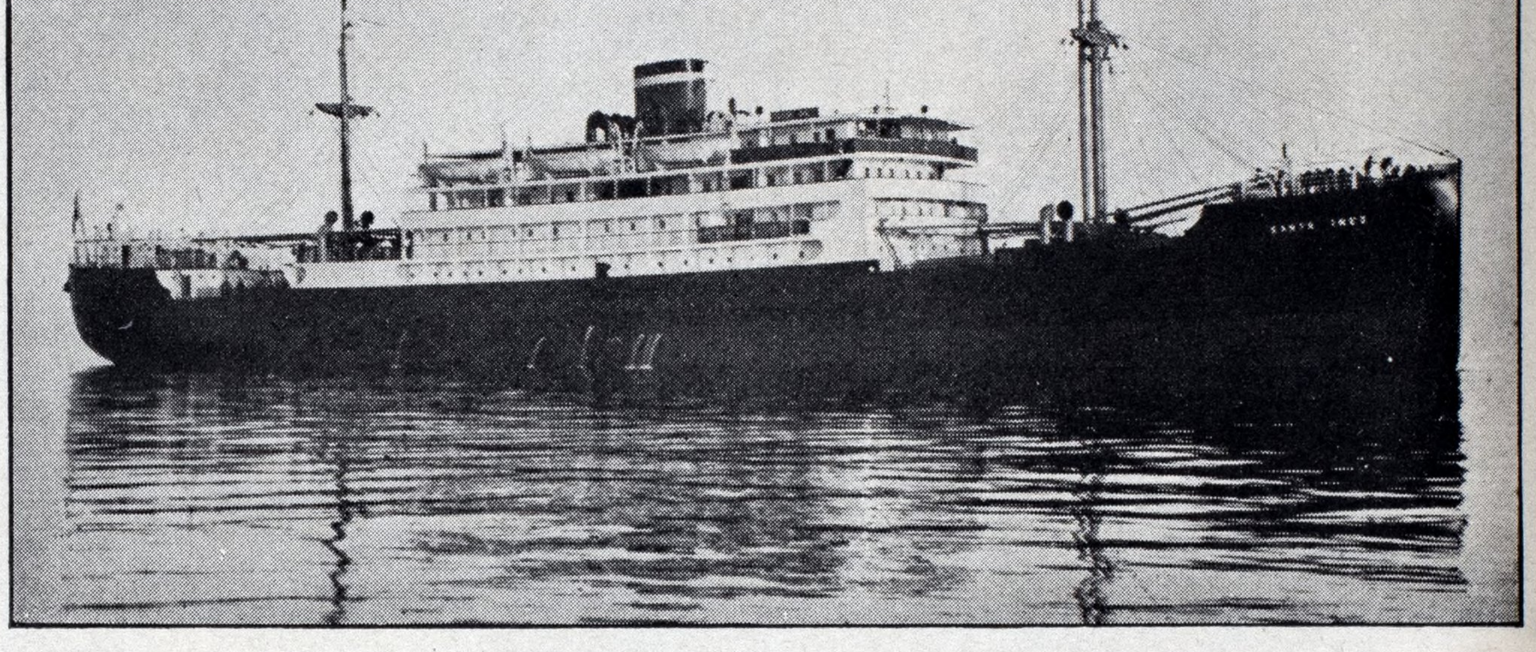
SINGLE ACTING SIMPLICITY
IN SIZES UP TO 7000 H.P.



BUSCH-SULZER BROS.-DIESEL ENGINE CO., ST. LOUIS, MO.

TWO RECTOR ST., NEW YORK — RIALTO BLDG., SAN FRANCISCO.





The sisterships, *Santa Rita* (above) and *Santa Inez* (at right), newest members of the Grace Line fleet. Both are equipped with 6-cylinder B & W Diesels, developing 3600 s.h.p. at 135 r.p.m.

Gargoyle Marine Oils chosen

for two latest additions to the Grace Line fleet

The sisterships, *Santa Inez* and *Santa Rita*, are the most recent additions to the Grace Line's fleet of fast motorships, operating between New York and principal ports on the West Coast of South America.

6-cylinder B & W Diesels, developing 3600 s.h.p. at 135 r.p.m., give these new motor liners a service speed of 14 knots. And, as in other fast Grace Line ships, Gargoyle Marine Oils are used to insure efficient and economical operation in the engine room.

The experience of Grace Line engineers with these high-quality lubricants corresponds to that of hundreds of other marine engineers throughout the world, who have found through consistent use that Gargoyle Marine Oils

—conserve power and increase speed
—reduce fuel consumption
—lessen the chance of breakdowns and costly repairs
—and prolong the life of propelling machinery.

GARGOYLE

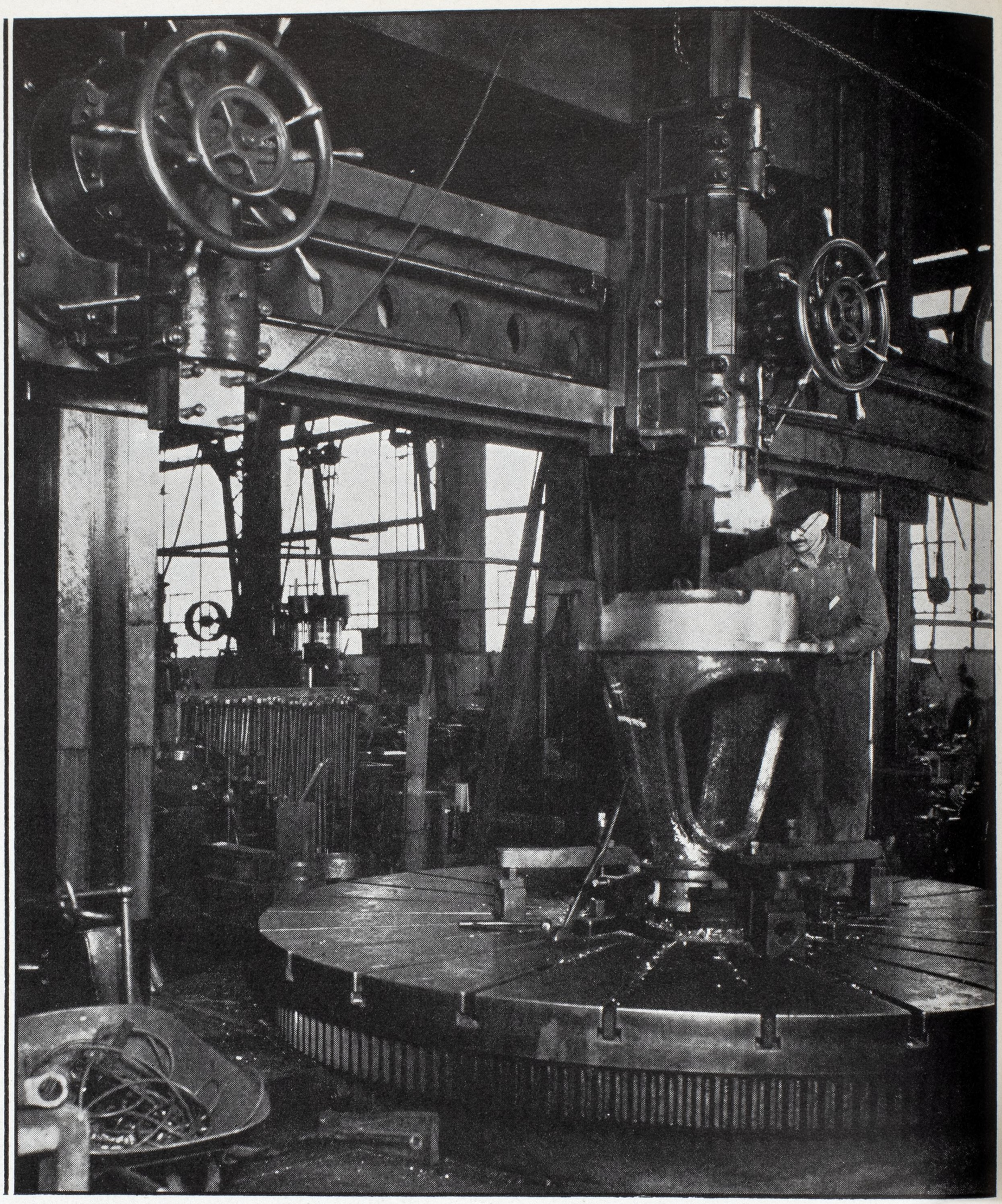
Marine Oils

A grade for each type of service

Complete supplies of Gargoyle Marine Oils are readily available in more than 300 of the world's leading ports. At each of these ports there is an experienced Vacuum Oil Company representative ready at all times to confer with you on your lubricating problems.

NOTE: We will be glad to send you, without obligation, any of our three authoritative treatises on Marine Lubrication: "Steamships with Reciprocating Engines," "Turbine Propelled Steamships," "Marine Lubrication—Motorships." Address: Vacuum Oil Company, Marine Sales Dept. D-12, 61 Broadway, New York City.

Vacuum Oil Company *Specialists in the manufacture of high-grade lubricants for every class of machinery Obtainable everywhere in the world* **New York, U. S. A.**



Boring mills of assorted sizes in "American Ship's" machine shops areadditional reasons why "American" is able to make ship repairs so speedily and economically. This giant on the right both bores and turns. It has a capacity of 14 feet 2 inches in diameter by 10 feet high.

WHAT A BORE!

BORING mills of widely differing sizes, big forge presses, lathes, raw materials, foundries—these constitute only a few of the complete ship-building and repair resources concentrated in "American Ship's" five strategically located shipyards. No repair job is too big for them; no job is too small.

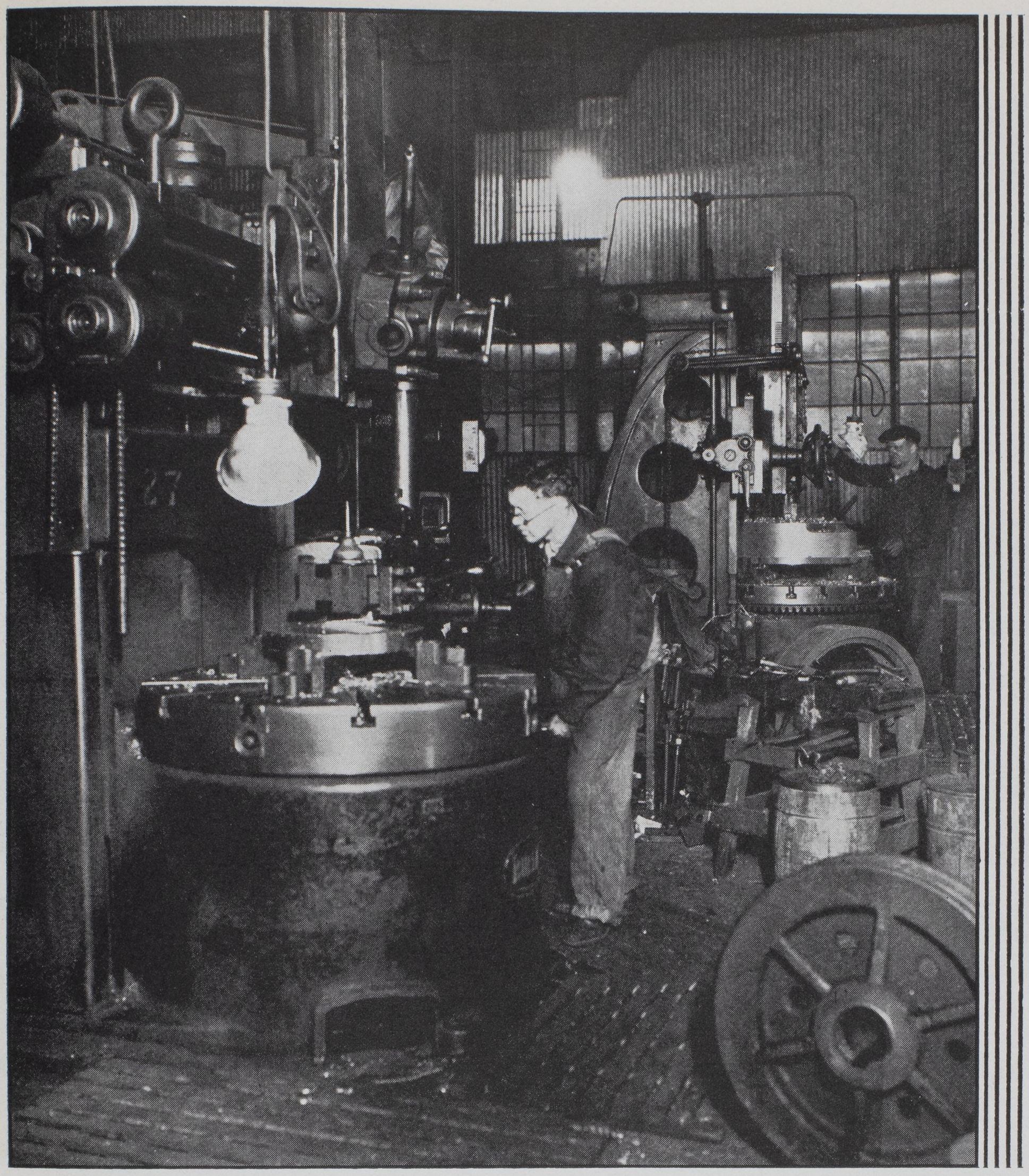
And that's what makes American Ship so helpful to ship operators, be-

The AMERICAN

CLEVELAND
American Ship Building Co.

LORAIN
American Ship Building Co.

BUFFALO
Buffalo Dry Dock Company



Smaller work, too, is as easily done in these other boring mills. Here in the foreground, the machine is facing a collar. And in the background, another mill is turning a cylinder head. This marked flexibility is typical of "American Ship's" facilities, and speeds repairs for your ships.

cause it enables them to reduce the time required for ship repairs to the minimum, with the positive assurance of reliable, accurate work.

Nowadays ship operators are fully conscious that these complete facilities confer unusual flexibility upon the large ship building companies; and also the greatest efficiency and economy.

They appreciate, too, that it is especially important for them that they *keep* these resources mobile by a steady, unceasing flow of repair work.

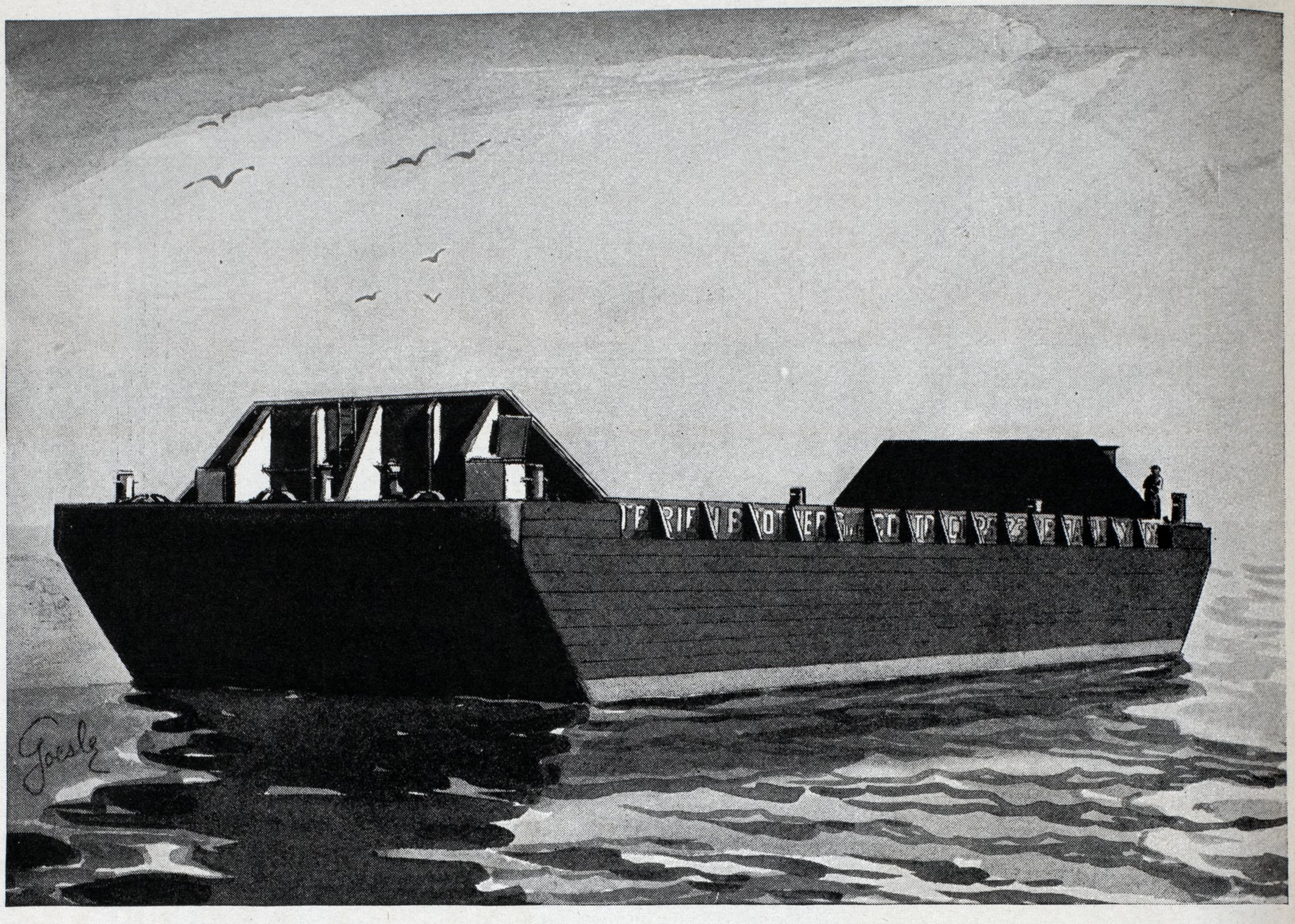
So, more and more, ship operators are sending all their repair jobs, large and small, to American Ship.

SHIP BUILDING Co

SOUTH CHICAGO
Chicago Ship Building Co.

SUPERIOR
Superior Shipbuilding Co.

FEDERAL WELDED BARGES



FEDERAL WELDED BARGES ARE GOOD BARGES

SATISFY EVERY REQUIREMENT

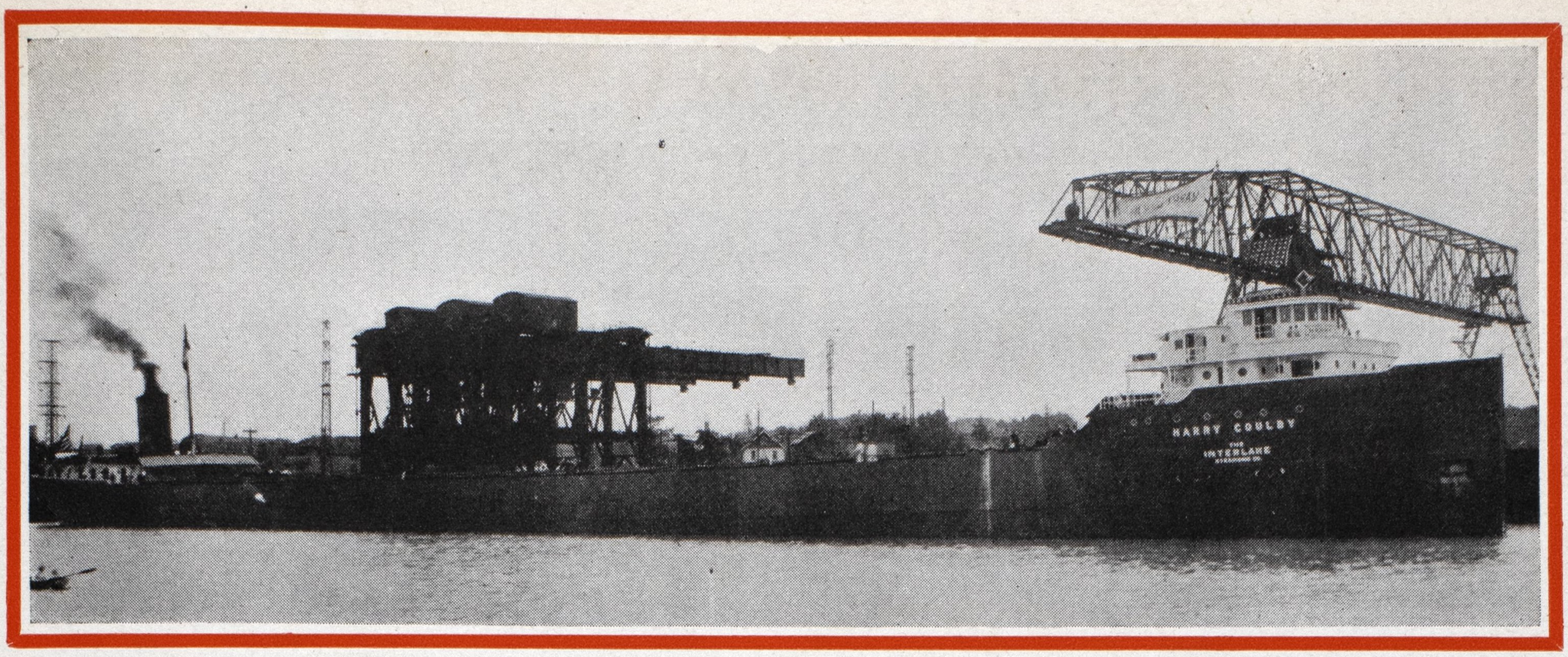
Design adopted after several years investigation...Over 50 miles of welding performed on scows, oil barges and lighters of this design...75 per cent of the welding is done by automatic machinery, securing uniform and precise workmanship...Underwater surfaces doubly sealed by welding on outside and inside.

Damage repairs simple, wherever hand welding is available.

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY

GENERAL OFFICE AND WORKS: LINCOLN HIGHWAY, KEARNY, NEW JERSEY

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

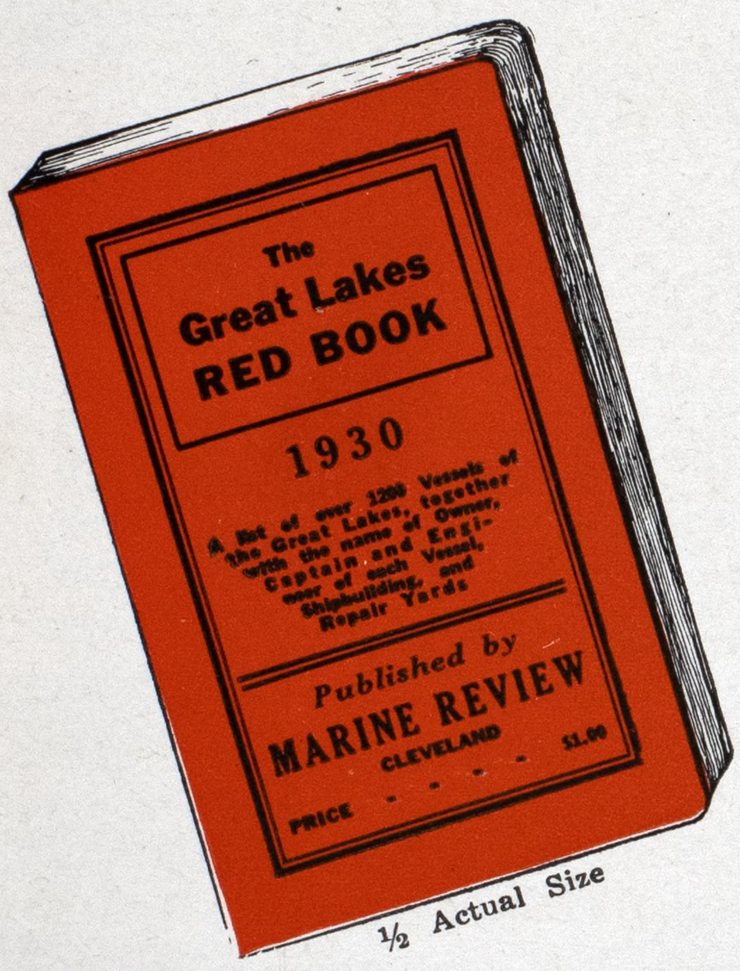


Announcing the-

1930

(27th Annual Edition)

GREAT LAKES RED BOOK



½ Actual Size

1. It has a complete alphabetical index giving the names of lake vessels.
2. It contains a complete, alphabetical list of every vessel owner and operator; name of the master and engineer of each ship; name of every marine superintendent, fleet captain, fleet engineer or other directing heads of each fleet.
3. It gives capacity of the Lake vessel at about 19′ draft,—each ship named in alphabetical order.
4. It contains a complete directory of the shipbuilding and ship repair yards serving shipping on the Great Lakes, with the names of the chief officials of each yard and description of facilities.
5. It has a port directory and classified buyers' guide in which each advertiser is listed geographically and according to product. This also provides an inexpensive means for the advertising of stores and ship chandlers, located at Lake ports, who sell to Lake ships.

Issued just before the start of navigation on the Great Lakes the RED BOOK for 1930 will contain the carefully compiled and up-to-date information about the vessels, and the companies operating them, that has made it for years the most widely used and best known directory on the Great Lakes.

It is convenient, VEST-POCKET size and is used daily by captains, engineers and others aboard ship, and by executives of operating companies.

Business on the Great Lakes is constantly growing. Millions of dollars are spent in the operation and repair of the vessels which comprise the Great Lakes Fleet. The RED BOOK reaches the men who own and operate this vast fleet in a way possible for no other directory.

Space reservations are now being made and the cost is low. We'll gladly give you full details.

GREAT LAKES RED BOOK

Published by **MARINE REVIEW**

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NEW YORK	CLEVELAND	CHICAGO
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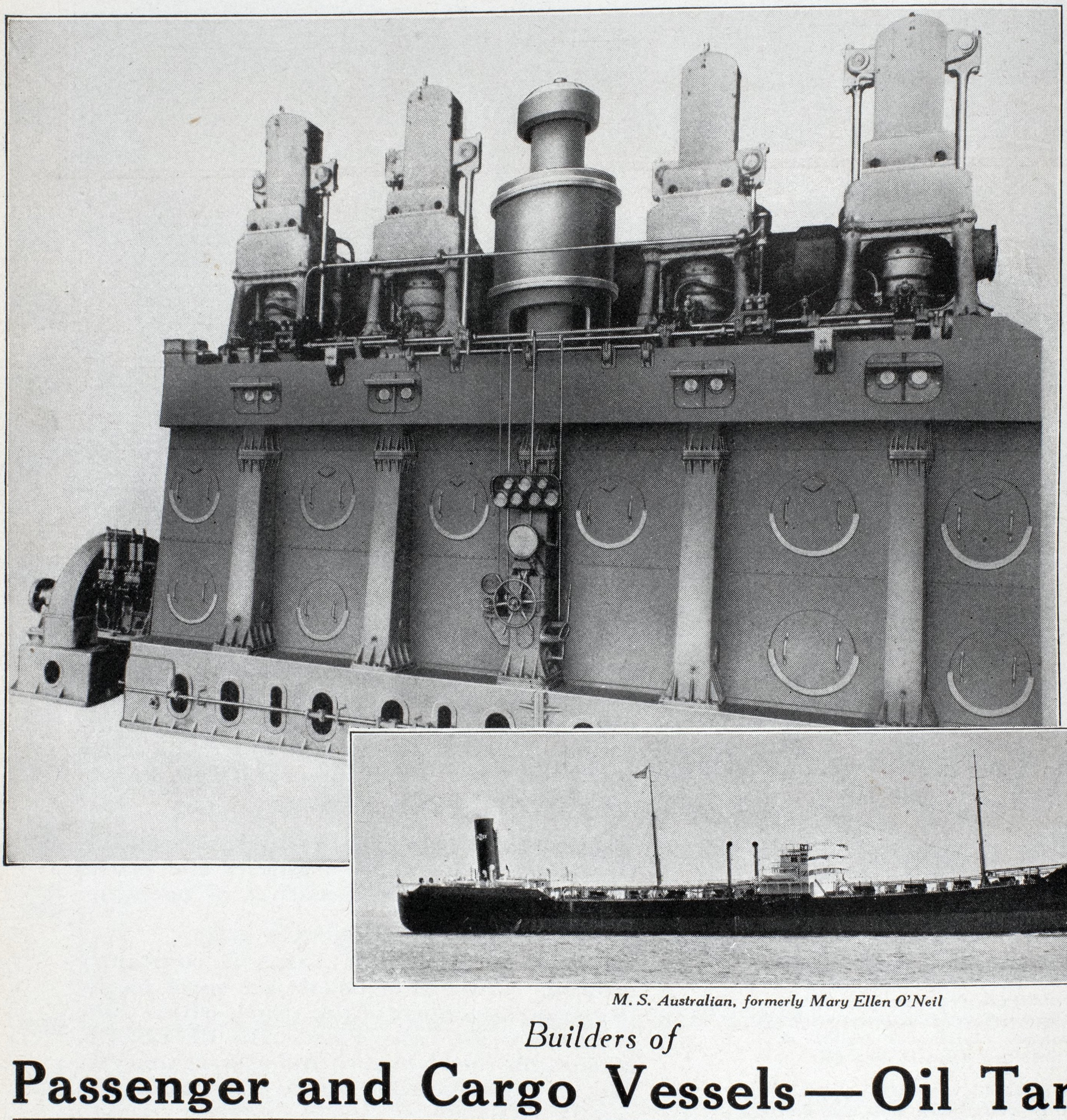
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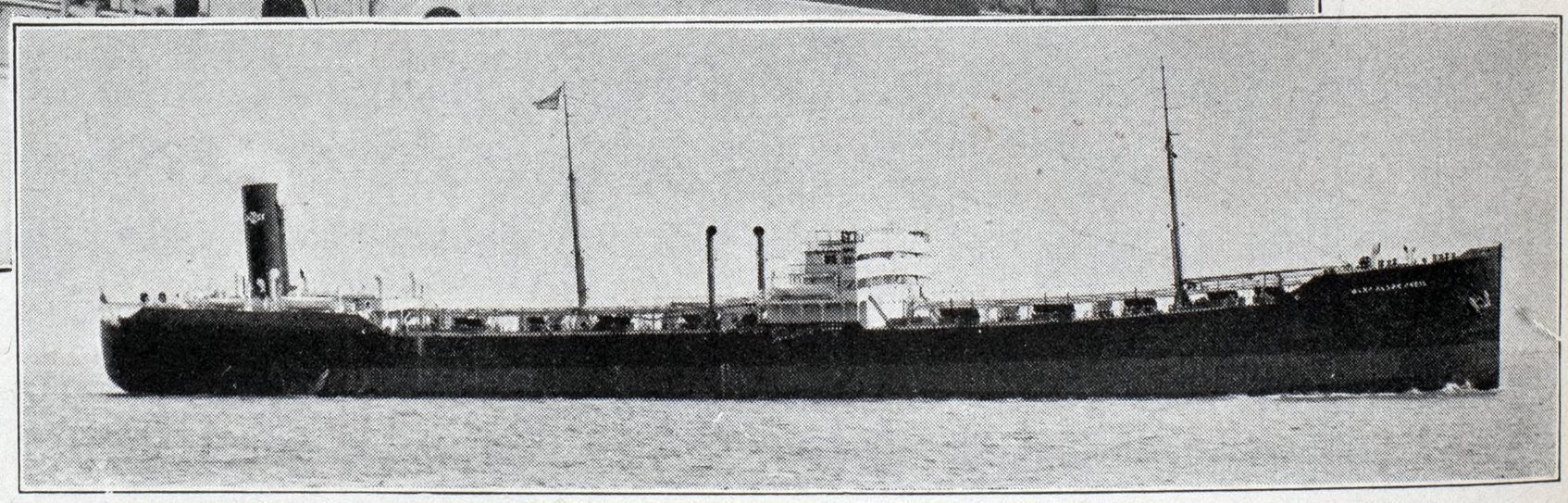
DRYDOCKING AND REPAIRS

BUILDERS OF ALL TYPES OF VESSELS

SUN-DOXFORD
OPPOSED-PISTON
DIESEL ENGINES

Power with Efficiency





M. S. Australian, formerly Mary Ellen O'Neil

Builders of

Passenger and Cargo Vessels—Oil Tankers

unlimited facilities for

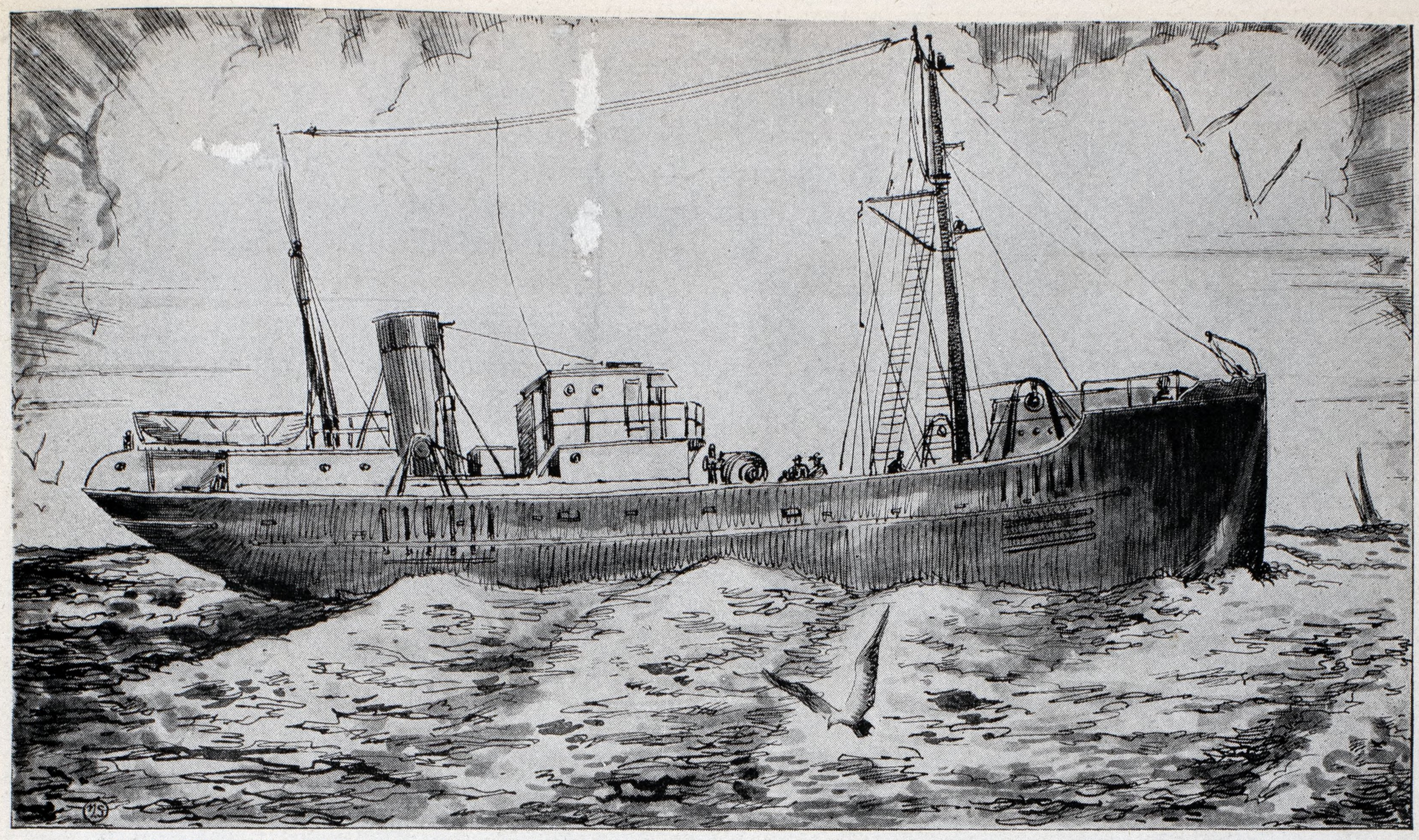
MARINE REPAIRS

Two floating Dry Docks—11,000 Tons Lifting Capacity Each

SUN SHIPBUILDING & DRY DOCK CO.

Shipyard & Main Office
CHESTER, PA.

25 Broadway
NEW YORK



The Diesel-Electric Trawler "Notre Dame," sister ship of the "Fordham," both of which are now building at the Bath Iron Works Corporation for the A & P Fish Co. and are being powered with 500 H. P. Cooper-Bessemer Diesel Engines. These vessels, upon completion, will be the world's largest trawlers, measuring 132′ 4″ in overall length, 24′ beam, 13′ in depth, with fish hold capacities of 300,000 lbs., and speeds of 12 knots.

A BESSEMER PAYS BEST AS A FISHING PARTNER

FOR quick passage to and from the banks; for lower operating costs; for less unproductive time in port; in short, for the ultimate in engine performance there is no substitute for the service-tested performance of Bessemer Diesels. These engines are known at all east coast fishing ports as the best of fishing partners—engines that work with you and for you, making more trips, landing more fish and enabling you to show a larger net profit at the end of the season.

The trend to Bessemer Diesels is indicated by their selection to power the world's largest trawlers—"Notre Dame" and "Fordham"—now building at the Bath Iron Works for the A & P Fish Co. These vessels, the last word in Diesel-electric Beam Trawlers, are each being powered with a six cylinder direct reversible Bessemer Diesel engine of 500 H. P. at 230 R.P.M. On the forward end these engines will be direct connected to an 80 K. W. 115 volt D. C. Generator of the constant voltage, variable speed marine type, while on the after end a 54″ magnetic clutch is installed between the flywheel and the Kingsbury thrust, the flywheel being designed as a part of this clutch. This permits the propeller shaft to be disengaged so that continuous operation of the engine and generator will supply current for the deck trawl winch.

In addition to the "Notre Dame" and "Fordham," 8 cylinder Bessemer Diesels have been selected to power three other large trawlers, almost identical in size, which are now building. This selection of Bessemer Diesels for these modern vessels assures them a long, profitable fishing career, because it is not just a coincidence that the best earners in the fishing fleets are Bessemer powered.

THE COOPER-BESSEMER CORPORATION

General Diesel Sales Offices: 25 West 43rd Street, Suite 301, New York City. Factory: Grove City, Pa.

Canadian Diesel Representative: Diesel Power Ltd., 129 Adelaide St., West, Toronto, Ont., Canada

Bigger Power Plants—Higher Efficiencies

FABRICATION of modern power plant piping requires oxwelded joints that are not only as strong as the pipe—100% efficient—but also tough and ductile. Where efficiency, reliability and permanent tightness count most, power plant piping is fabricated under Linde procedure control.

The Best of Everything for
OXWELDING AND CUTTING

LINDE OXYGEN
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Dissolved Acetylene
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Apparatus and Supplies
Oxweld Acetylene Company

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Union Carbide Sales Company



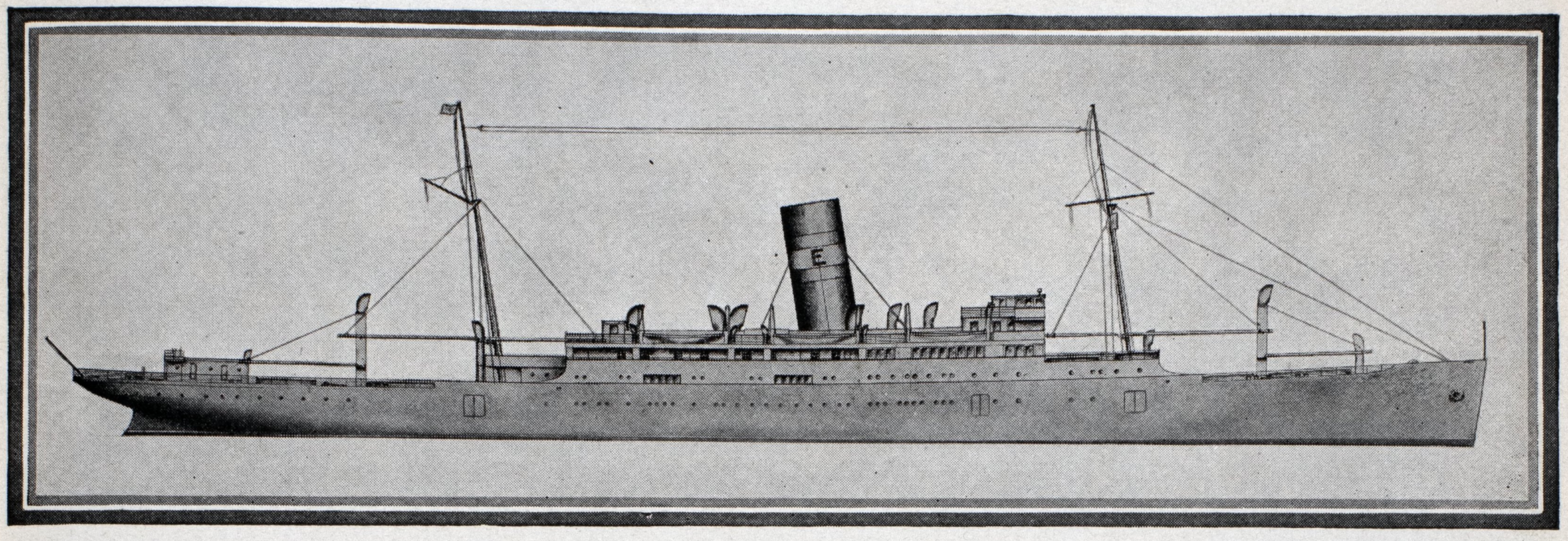
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64 Linde Plants—45 Prest-O-Lite Plants—154 Oxygen Warehouse Stocks—138 Acetylene Warehouse Stocks—38 Apparatus Warehouse Stocks—235 Carbide Warehouse Stocks

One hundred Warren Pumps



centrifugal and reciprocating, will be installed on the four new passenger and freight ships built for the Export Steamship Company.

Four more names to add to the long list of Warren equipped vessels which already includes the S.S. California and her sister ships, Virginia and Pennsylvania. C.G. Cutter Chelan and class, S.S. Humuula, Hualalai and Waialeale, S.S. Dixie, El Oceano and El Coston, S.S. Gulfbird and fleet of 29 ships, and many others equally well known.

Warren pumps are used for every service on board ship, maintain their original efficiency, have unusually low operating and maintenance costs, deliver steady, dependable service. Include them in your specifications. Bulletins or estimates?

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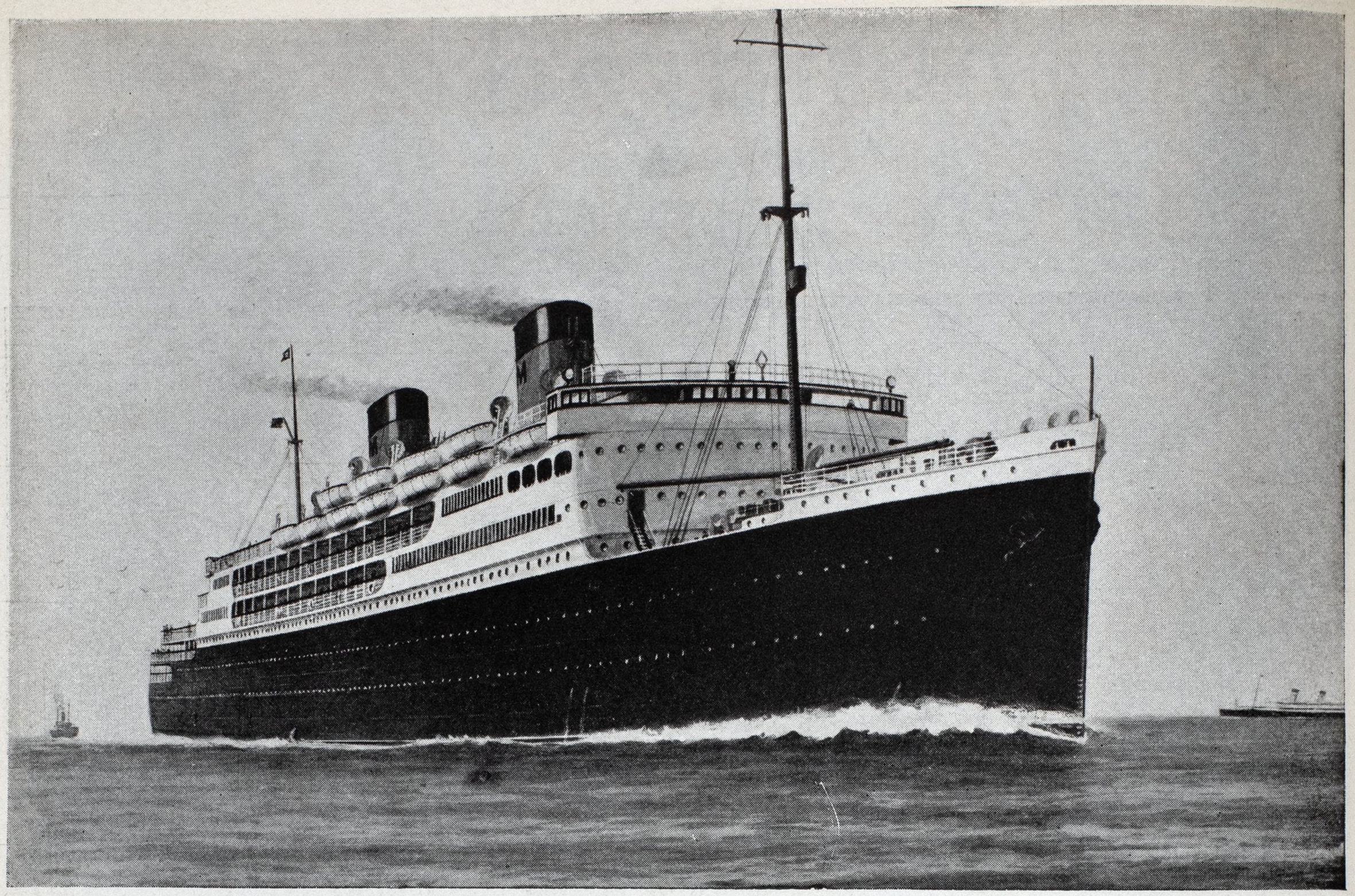
Steam Pump Company Inc.

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One of the two 26,000 ton liners now under construction for the Matson Line at Fore River Plant, Quincy, Mass.

Two great Trans-Pacific Liners

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OCEANIC STEAMSHIP COMPANY

Matson Line

Length overall: 632 ft. Beam Mld: 79 ft. Draft: 28 ft.
Displacement: 26,000 tons. Speed: 20 knots

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at Bethlehem's Fore River Plant

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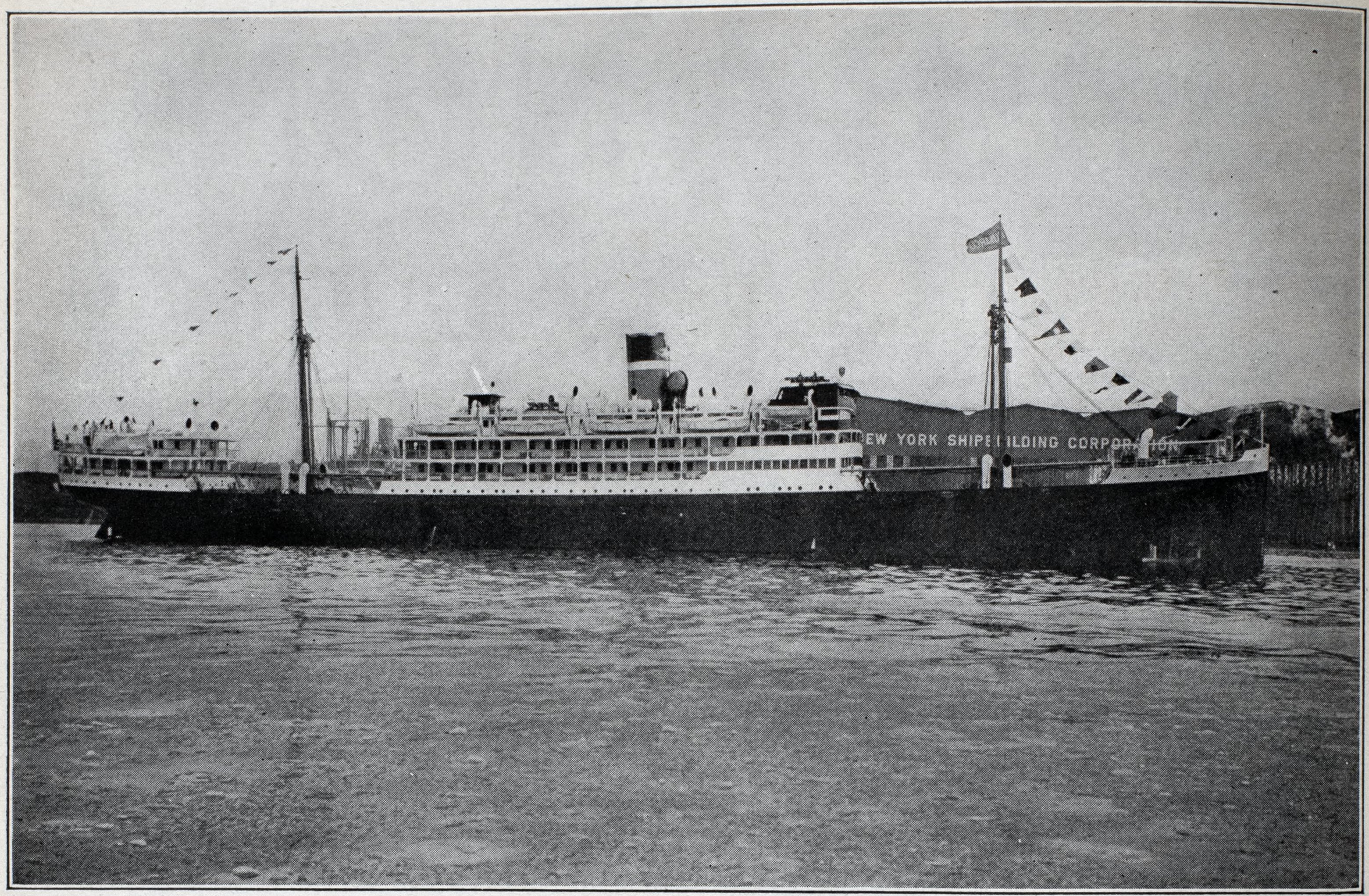
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1,000,000 Miles of Continuous Operation

THE Munson Liner MUNARGO has traveled more than 1,015,000 engine miles since she went into regular service on the New York-West Indies run in 1922 . . . The last routine inspection disclosed the fact that her turbine propelling machinery of the Parsons type, built and installed by New York Shipbuilding Company, was in first class condition after 1,000,000 miles of continuous operation.

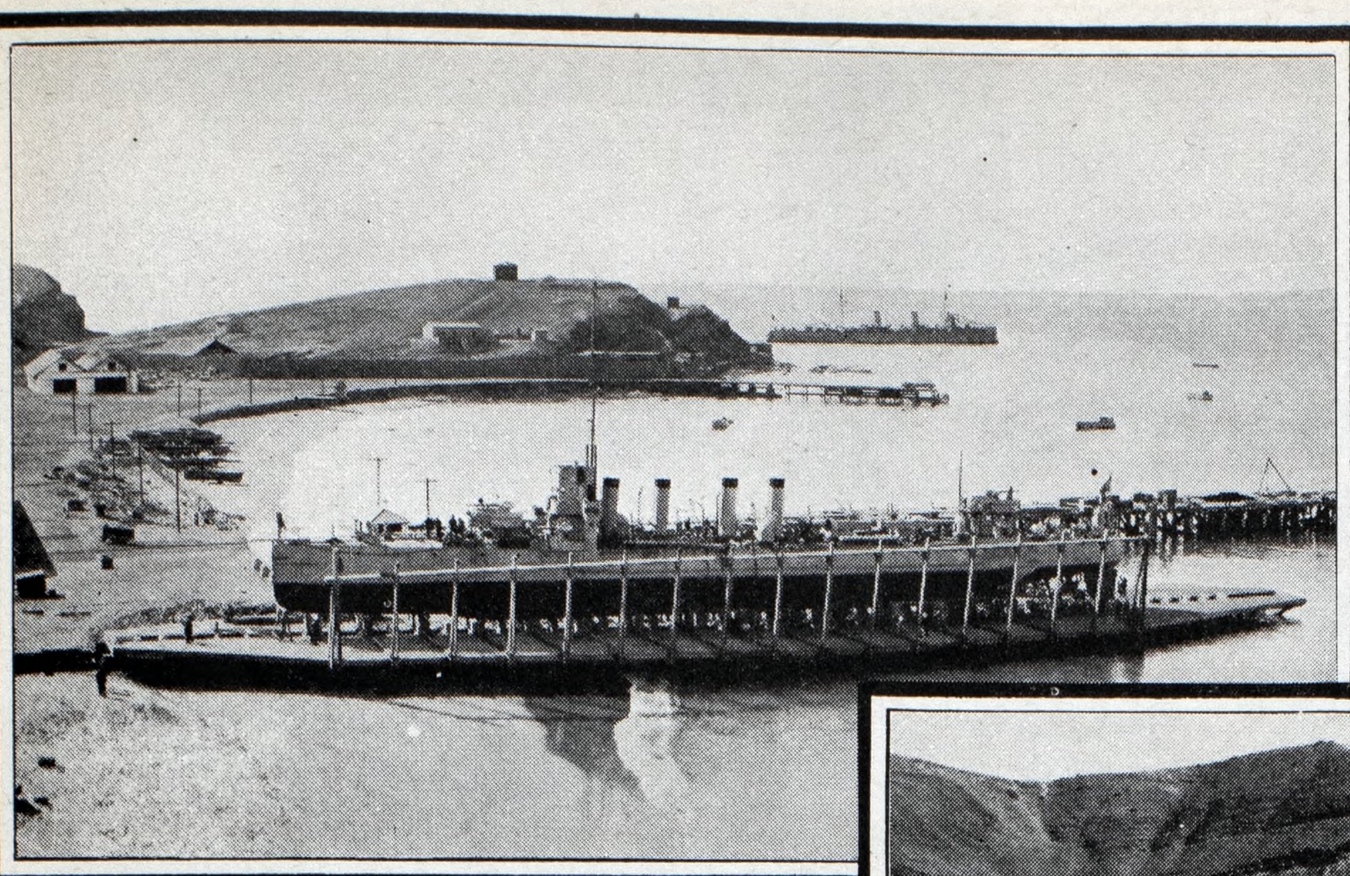
Other Ships of the Munson Line built by New York Shipbuilding Company:

T. S. S. AMERICAN LEGION
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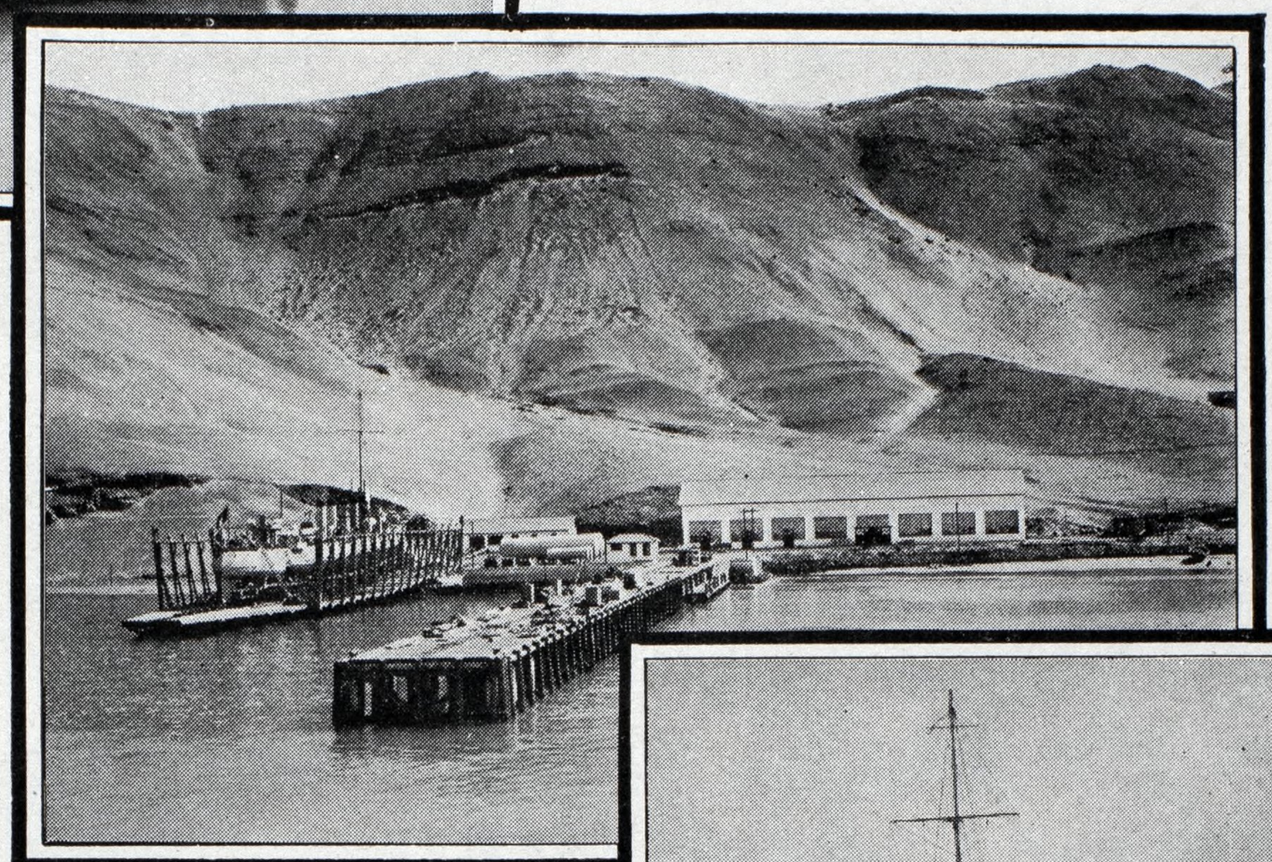
NEW YORK SHIPBUILDING CO.

General Office and Plant:
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New York Office:
420 LEXINGTON AVE.



THE photograph at the left shows the Crandall Railway Dry Dock drawn up above high water. Below are shown a view of the pier and dry dock with the hills beyond; and a closer view of the dry dock. The bird's-eye view includes the buildings.





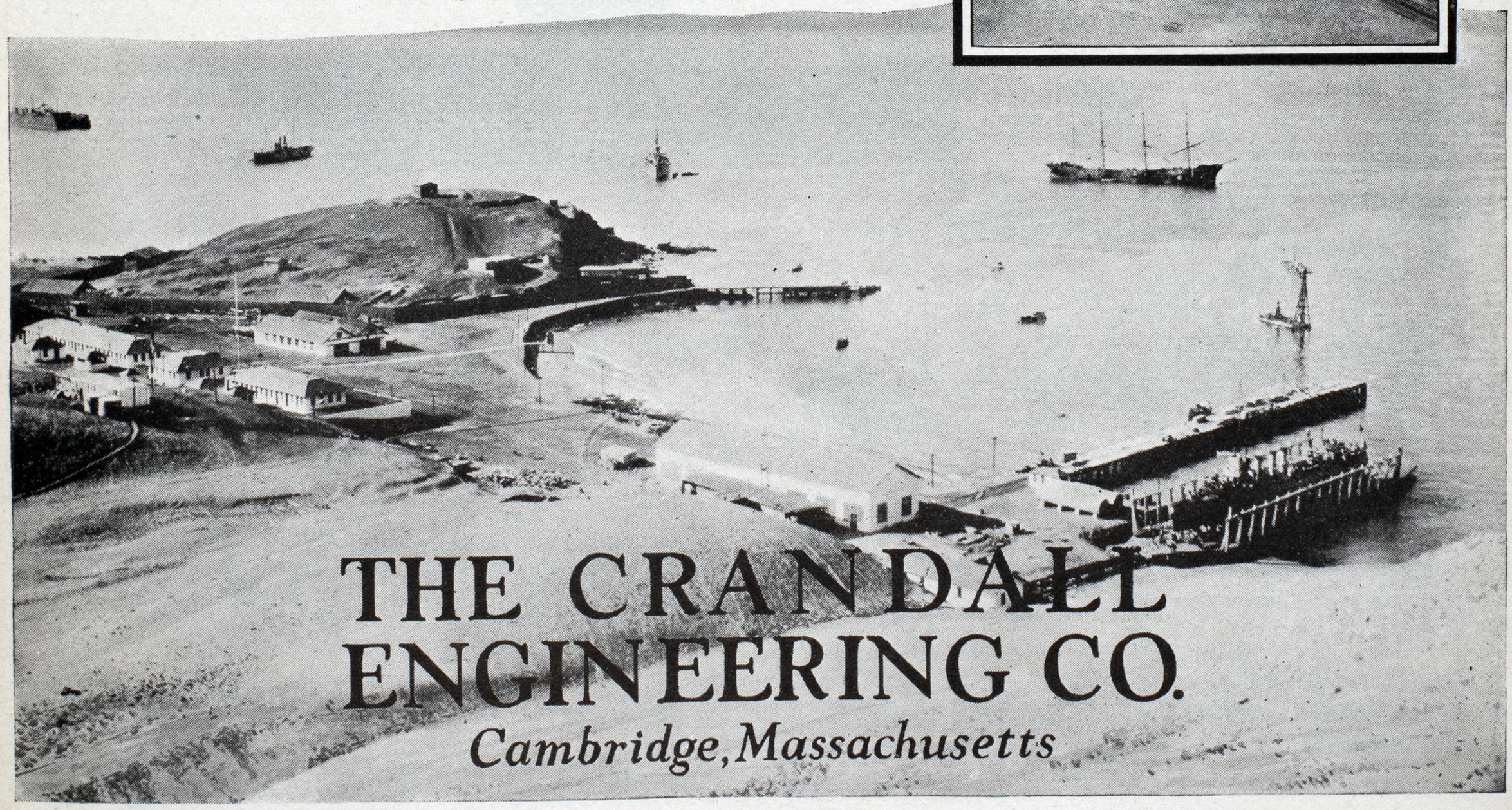
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A complete Submarine Base —

by Crandall

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FRANK M. SCOTTEN, Mechanical Engineer
227 Military Rd., Dearborn, Mich.....Dearborn 447

GEORGE CAIN, General Yard Supt.
71 Elm St., River Rouge, Mich.....Cedar 4290-J

JOHN GREIG, Docking Foreman.
110 Walnut St., River Rouge, Mich.....Cedar 5558-W

FRED ERNST, Supt. Machine Shops
6230 Fort St., W., Detroit, Mich .....Cedar 0106

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112 Walnut St., River Rouge, Mich.....Cedar 5245-W

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122 Moy Ave., Windsor, Ont.....Burnside 1837-W

R. PEET, Solicitor
Park Avenue Hotel, Detroit, Mich.....Cadillac 8400

O. WOERFUL, Plant Supt.
2971 Seyburn Ave., Detroit, Mich.....Lincoln 3943-J

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E. D. MACKENZIE, Yard Supt.
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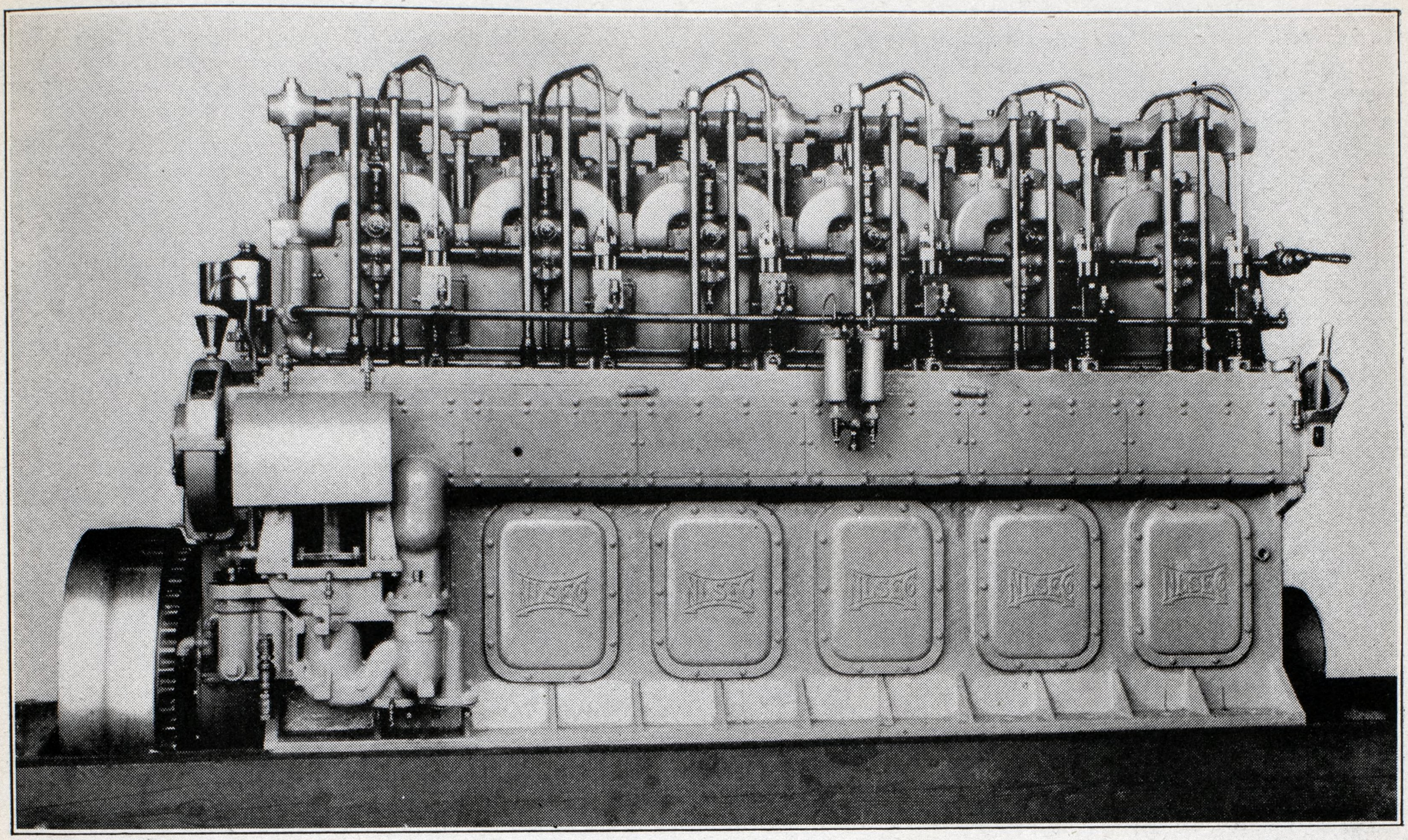
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Type 6MI-18 *6-cylinder, 4-cycle*

Especially suited for tugs, ferries, dredges, lighters, freighters and fishing vessels

THE Nelseco Diesel engine of 350 H.P. is suitable for either direct drive or Diesel-electric propelling systems. It is designed for continuous heavy duty and has been steadily refined over a period of five years—*representing the highest development of its type to date....* Features of this engine are its reliability and economy, two points of first importance in marine service. Being a four-cycle, mechanical injection type, its lubricating oil consumption is low because there are no ports in the cylinders through which it can escape. Its design is simple and rugged, with the result that maintenance costs are kept at a minimum. Special attention has been given the metallurgy of important engine parts, providing for long, reliable service. . . . We will be glad to send you complete information on this and other Nelseco Diesel engines. Write for catalog MR, and attested records.

ELECTRIC BOAT COMPANY

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New York Sales Office: 247 Park Avenue, New York City. *Original licensees from and collaborators with M. A. N. since* 1910

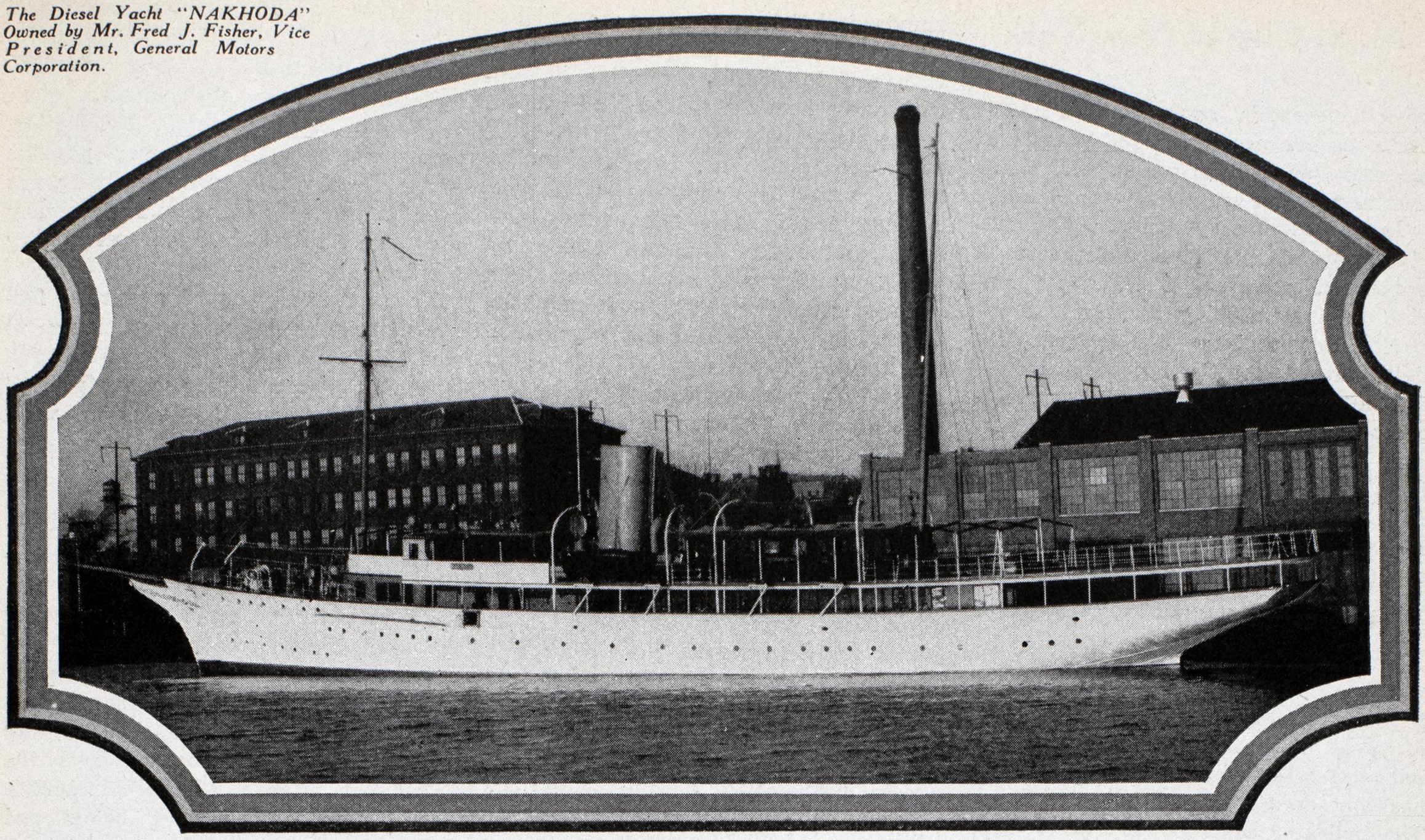
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The Diesel Yacht "NAKHODA" Owned by Mr. Fred J. Fisher, Vice President, General Motors Corporation.



TEXACO *lubricates the "Nakhoda"!*

The Diesel Yacht "NAKHODA", owned by Mr. Fred J. Fisher, Vice President of The General Motors Corporation, is the latest addition to the fine yachts of the world.

The "NAKHODA" is 236 feet overall. This vessel represents the last word in design, construction, furnishings, decoration and engine equipment.

The "NAKHODA" is TEXACO lubricated. Her main engines (two 8-cylinder, 250 R.P.M. Winton Diesel Engines of 1100 H. P. each) are lubricated with TEXACO URSA Oil. This oil is clean, clear, full-bodied and golden in color, and of surprisingly low carbon content. This oil will maintain compression in the cylinders. It will burn cleanly. It will protect the bearings and will assist greatly in maintaining the vessel's power and speed.

All other auxiliary equipment aboard the "NAKHODA"—Auxiliary Diesels, Air Compressors, Generators, Electric Motors, Pumps and Ice Machines—are also lubricated with TEXACO.

The choice of TEXACO lubricants for this vessel should be of interest to every motorship owner.

Write to The Texas Company for any information regarding marine lubrication.

TEXACO LUBRICANTS

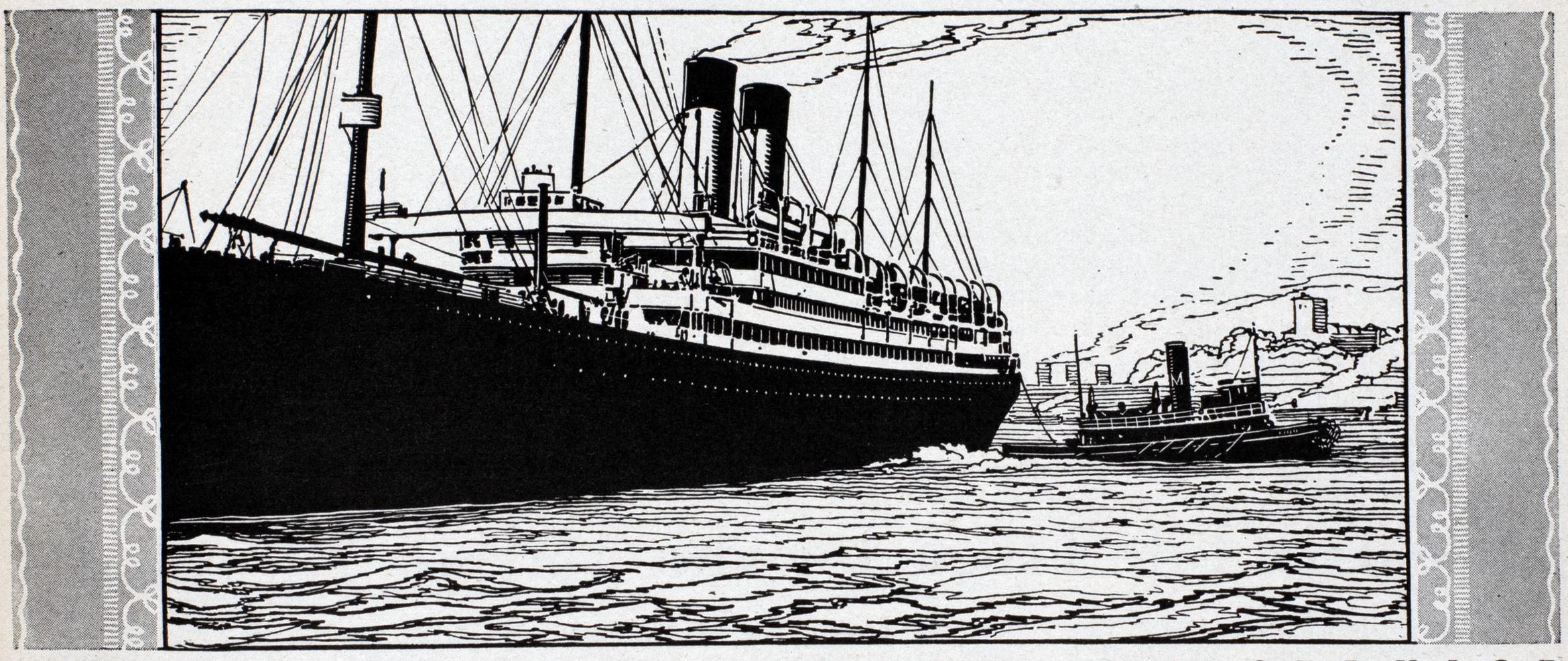
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Day and Night Service Every Day and Night in the Year.

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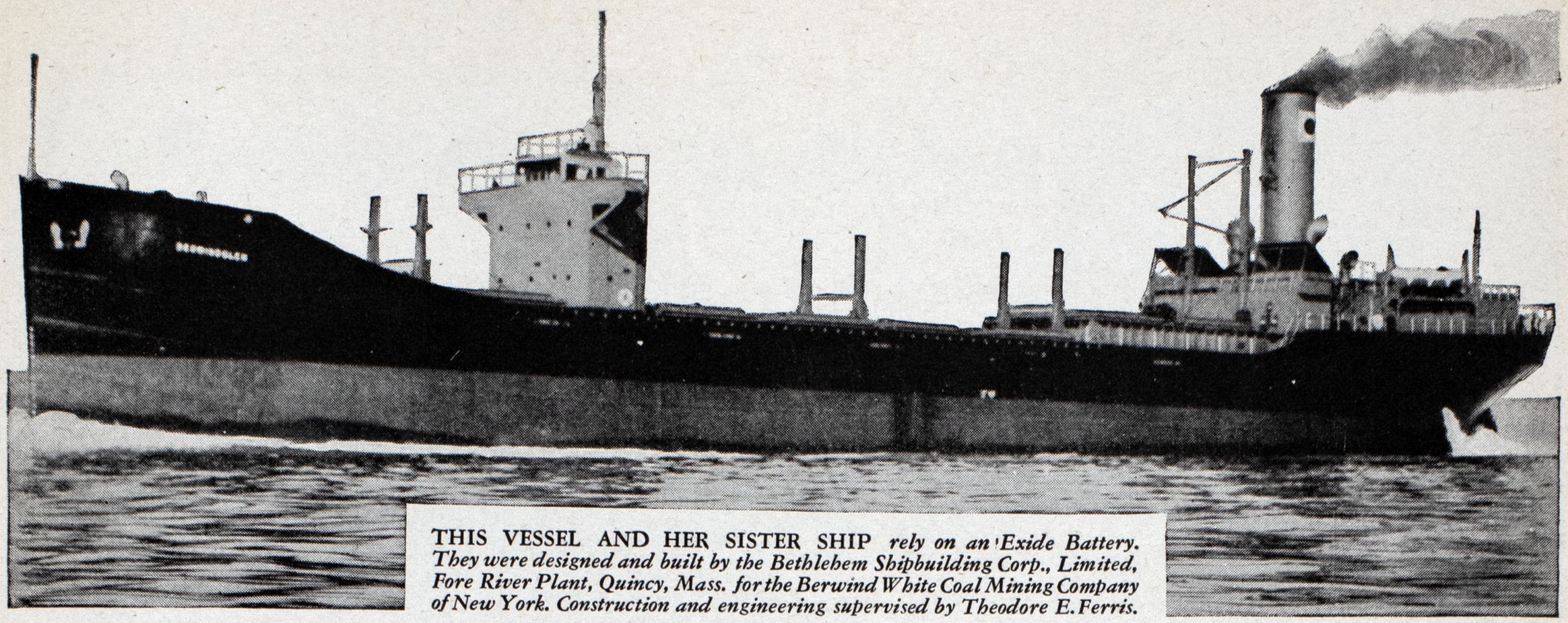
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MR 2-30



THIS VESSEL AND HER SISTER SHIP *rely on an Exide Battery. They were designed and built by the Bethlehem Shipbuilding Corp., Limited, Fore River Plant, Quincy, Mass. for the Berwind White Coal Mining Company of New York. Construction and engineering supervised by Theodore E. Ferris.*

Pulverized-Coal-Burning Colliers

rely on EXIDE *Batteries*

Two new vessels designed with new fuel system are equipped with reliable, economical Exides

THE *Berwindglen* and *Berwindvale* demonstrate an entirely new fuel system . . . the use of pulverized coal. This is largely an experiment to prove to the marine world that this system is efficient and economical. Consequently, all equipment selected for these two new vessels is of the finest. Each and every bit must do its job perfectly to add to the success of this new development. That's why Exide Batteries were chosen as a dependable safeguard.

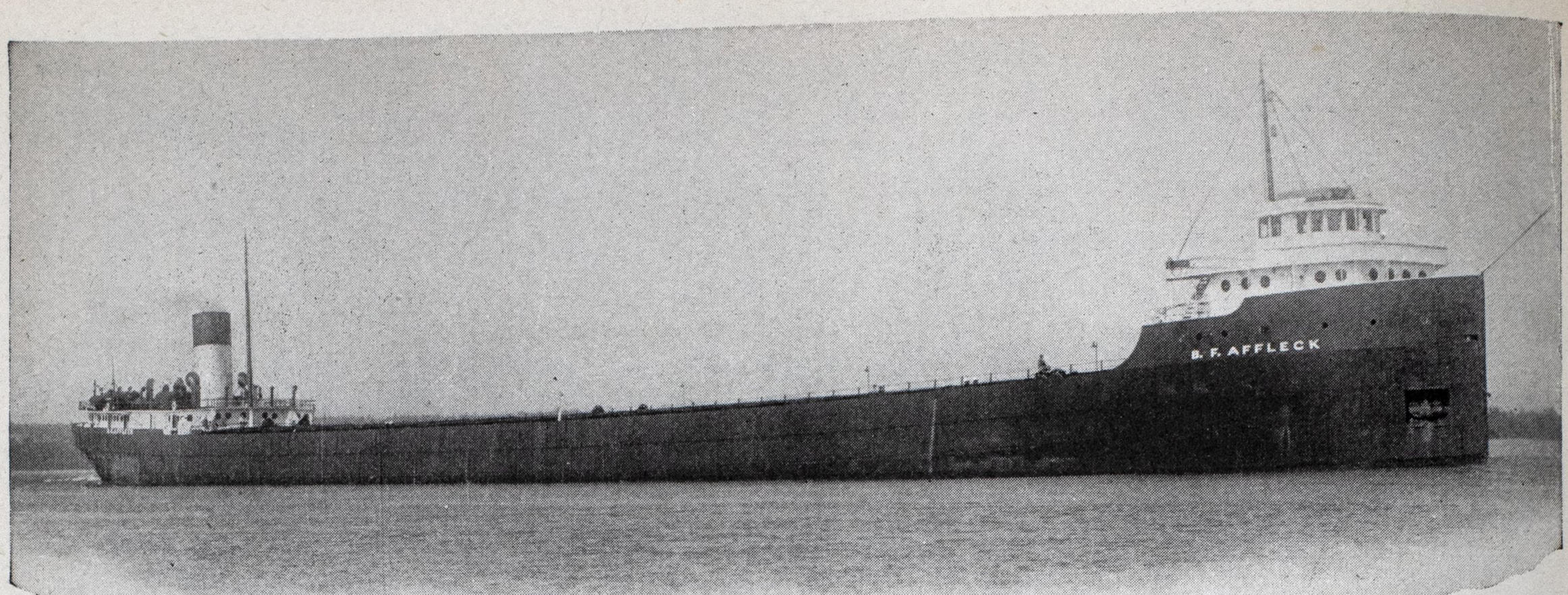
High up in these ships is the radio room . . . the eyes and ears of any boat at sea. And guarding this vital part of the ship is a reliable 60-cell Exide Battery, always on duty, day and night, to supply emergency power for the radio should normal current fail.

There are many good reasons why Exides were chosen for this important job. Designed by experienced engineers who keep abreast of the times . . . who watch carefully all developments in every field . . . Exide Batteries are built to do their jobs with maximum efficiency and minimum expense . . . steadily, economically, reliably. And these batteries are made by a firm with 42 years experience . . . the world's largest manufacturers of storage batteries for every purpose.

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THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE
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Finest Type of Great Lakes Cargo Carrier

S.S. B. F. Affleck owned and operated by the Pittsburgh Steamship Company, is a single deck bulk cargo vessel of the standard type built for the iron ore, coal and stone trade of the Great Lakes. Her molded dimensions are: Length overall, 604 feet, length between perpendiculars, 580 feet; width 60 feet and depth 32 feet. Capacity 12,000 tons.

A diversified experience, covering the construction of all types of ships, fully qualifies us to meet *your* requirements thoroughly and with despatch.

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By Faster Handling of Cargo





SURVEYS of marine terminal operations have proved that one of the biggest opportunities for reduction of operating costs lies in faster handling of cargo at the point of transfer.

At the Pacific Coast Terminal pictured at the left, one man, aboard an Elwell-Parker electric Lift Tructor, is bringing in a skid load of bundled rugs, pausing while the customs' inspector checks the load.

The only workman is the truck operator. No workmen are required for piling. The Tructor deposits the entire load in a jiffy and is away for another load. Sorting and loading of the skids is performed at ship-side. Reduced labor cost, resulting from the use of this E-P Tructor amounts to approximately $25 per day—more than $7500 per year.

Savings such as these have a direct bearing on terminal profits and are worthy of serious consideration by every terminal superintendent.

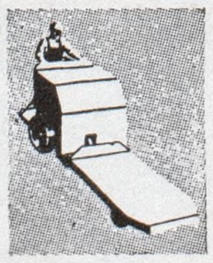
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Saving $7500 per year

On an Elwell-Parker Tructor, the power can be applied to the wheels before brake is released. A fully loaded Tructor can thus be stopped and started on a ramp without danger of slipping back. Your safety committee will appreciate the importance of this advantage.

The Elwell-Parker Electric Company

DESIGNERS AND BUILDERS  OF ELECTRIC INDUSTRIAL TRUCKS, TRACTORS AND CRANES FOR 24 YEARS

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TRUCTORS

Under Construction at—

Newport News

The Largest and Highest Powered American—Built Liners

THE insistent demand for increased speed in transportation is by no means confined to rail, highway and air travel. All the leading maritime nations are busily engaged on new ship designs to gratify the public's desire for faster ocean service.

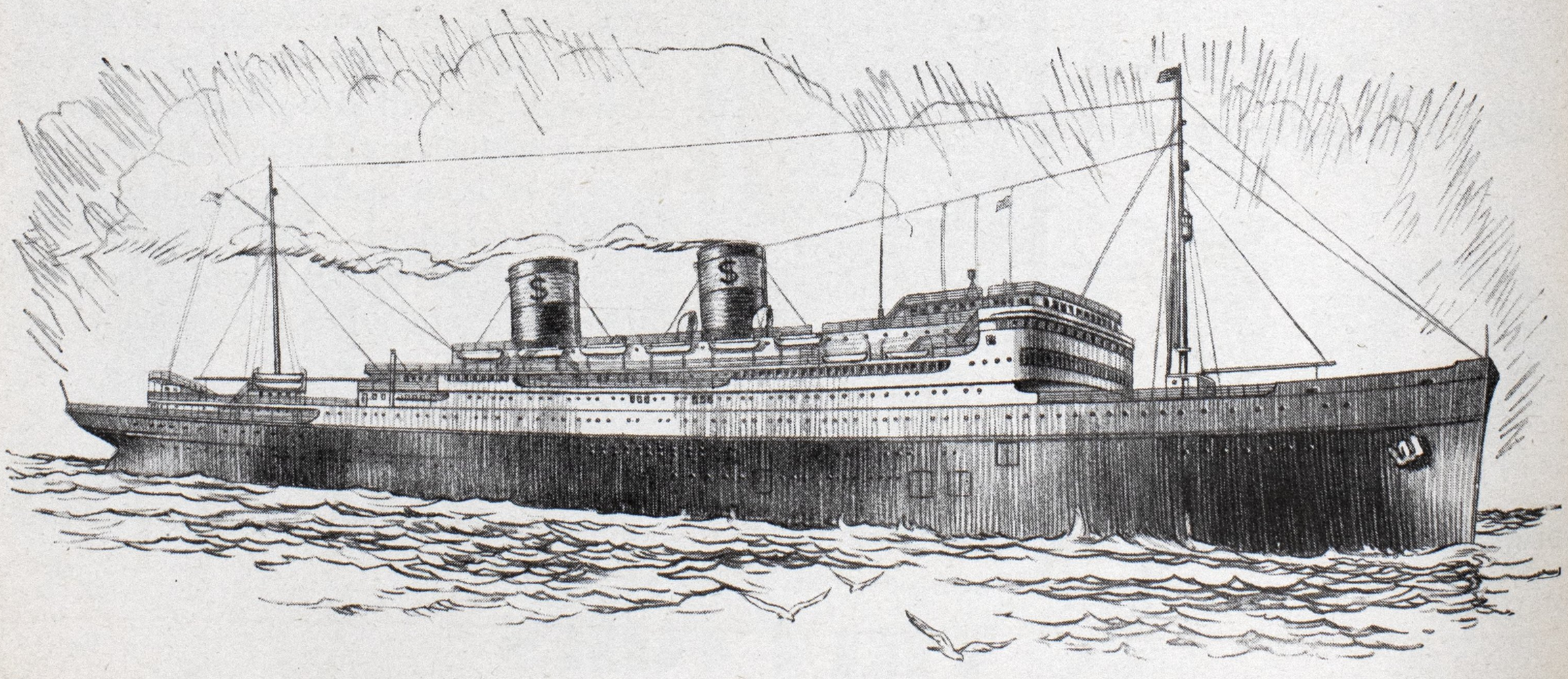
American steamship companies are wide awake to the present day requirements. Two of the largest and highest powered liners so far built in the United States are now under construction at Newport News.

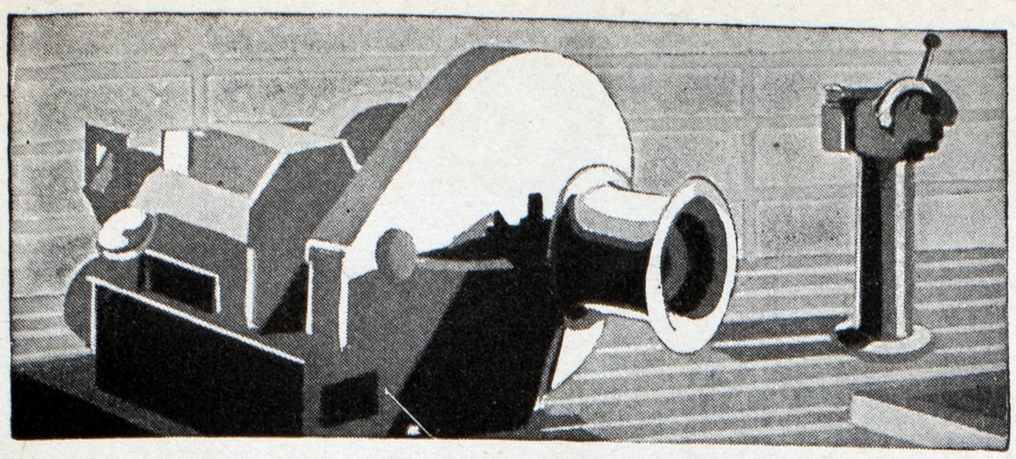
In placing this contract the Dollar Steamship Lines, Ltd., Inc. gave careful consideration to the yard facilities—scientific organization and the character of the ships built at Newport News as well as the excellent design of the vessels proposed for their requirements.

"SHIPS OF CHARACTER"

Newport News Shipbuilding and Dry Dock Company

Newport News, Va. 233 Broadway, New York City



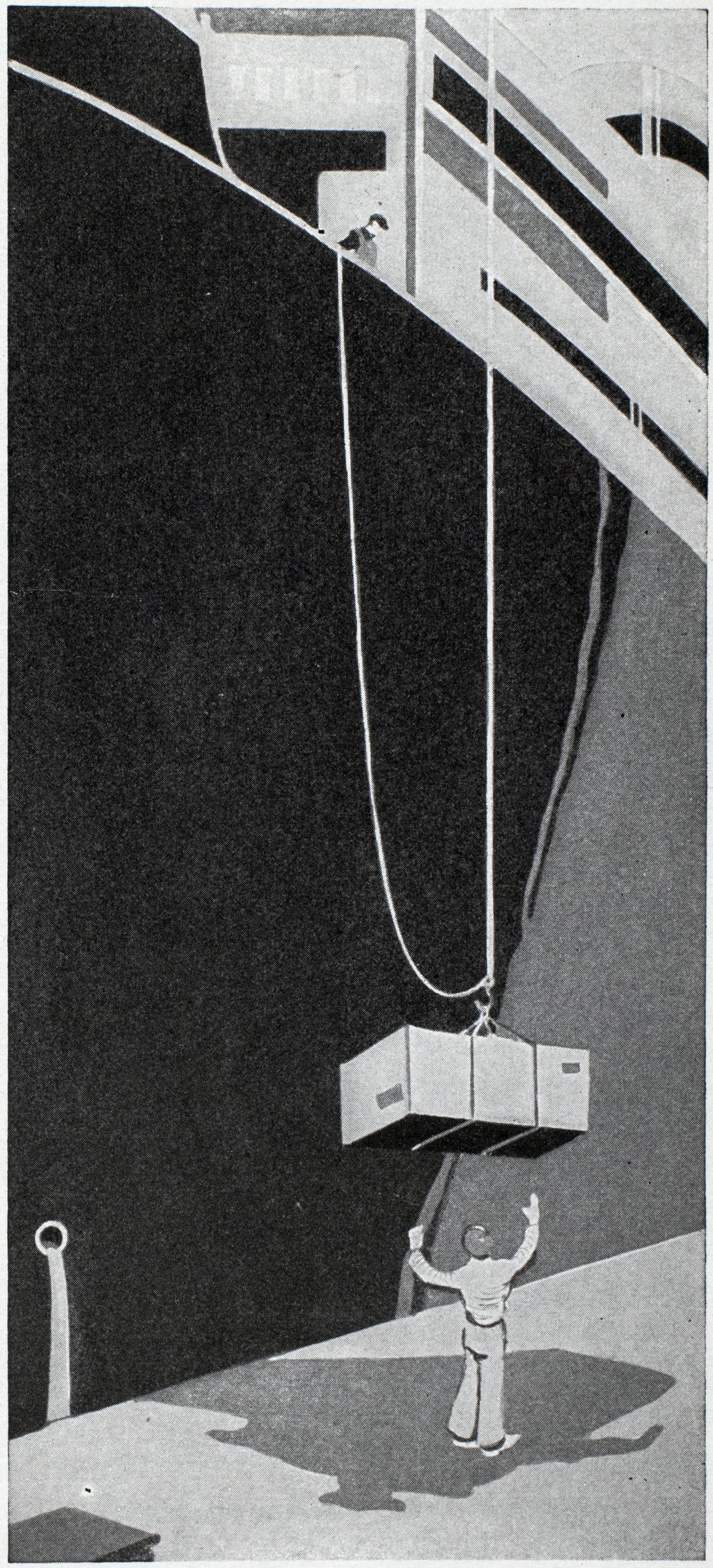


A FEW SMALL LEVERS

THE unseen power which drives the all-electric ship manifests itself in many ways. It comes, at the turn of a few small levers, to the anchor windlass, the capstan, the cargo winches, the rudder, the pumps, or the boat hoists. Simply, certainly, speedily, they do the bidding of even an inexperienced operator.

Motors and a few small levers have made responsive deck hands of ships' auxiliaries. Never jeopardize their usefulness with electric equipment of uncertain worth. G-E motors and control are products of careful study and design—bred to the sea.

General Electric also manufactures complete turbine propulsion machinery, electric equipment for Diesel-electric drive, searchlights, and other electric marine accessories. Its exceptional facilities and practical experience are at the disposal of ship builders and ship owners who would keep in step with maritime progress.



231-27

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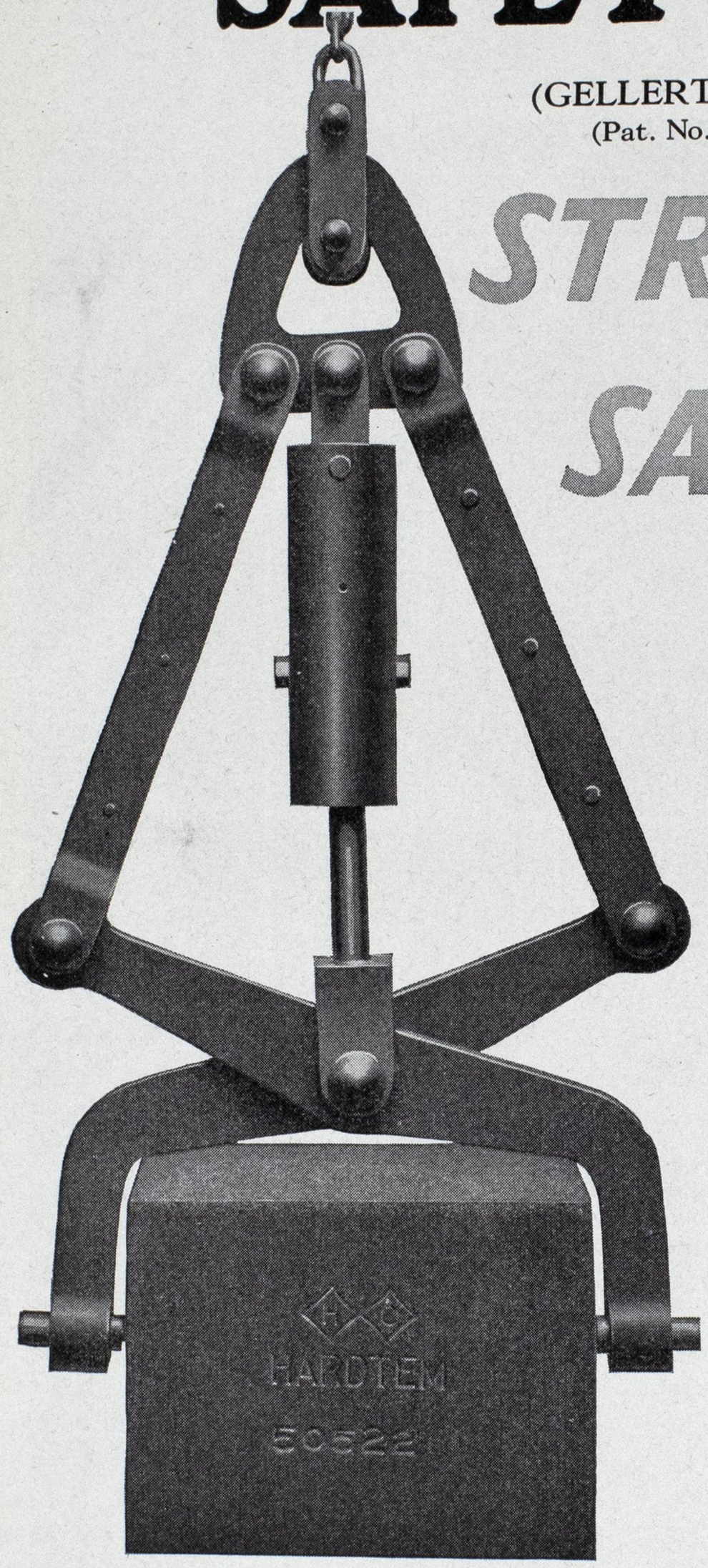
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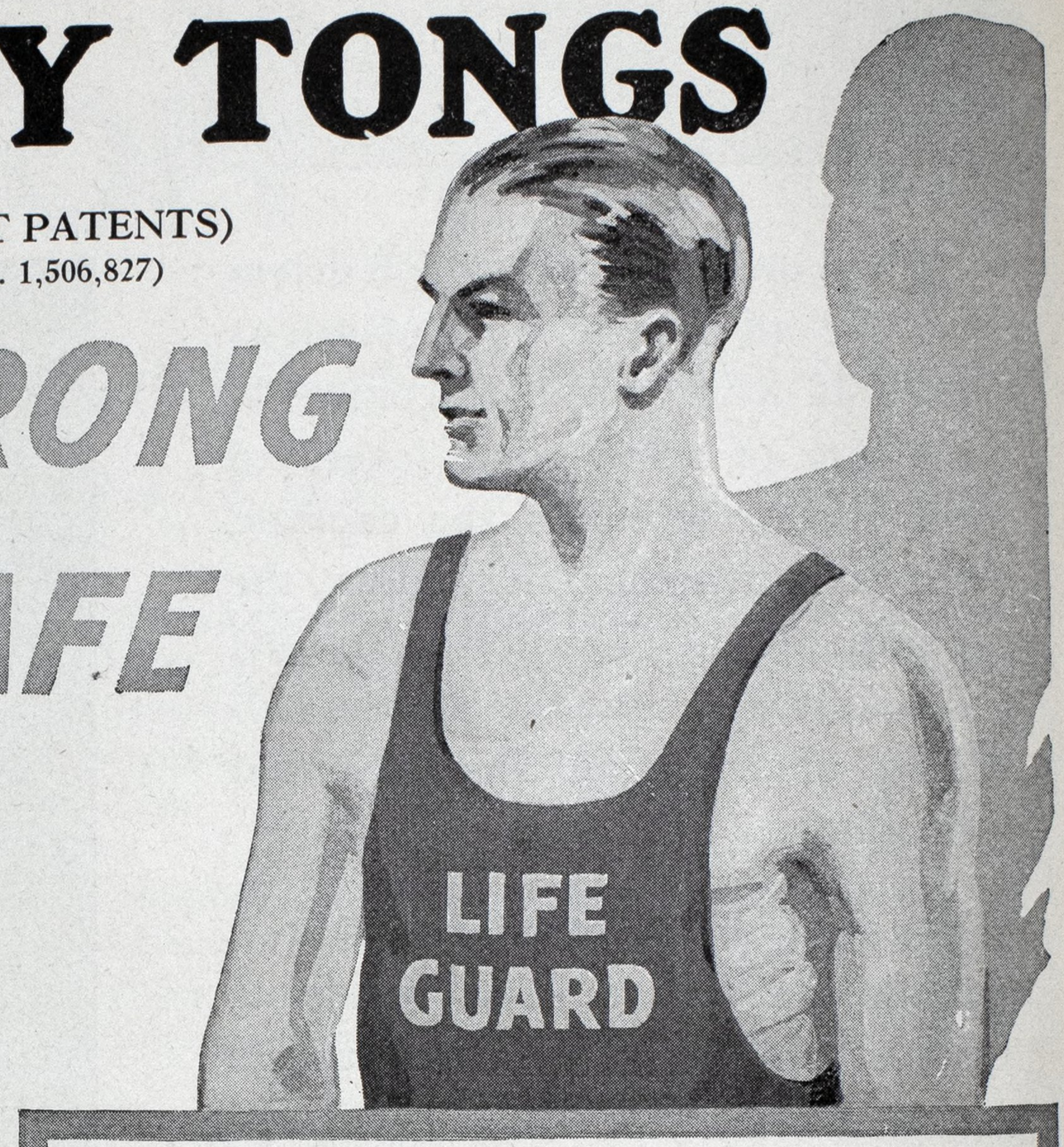
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(GELLERT PATENTS)
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A PURELY mechanical automatic latch . . . fully self-contained . . . only two moving parts . . . no springs or counterweights, pull or release ropes . . . always positive action—practically no wear, lubrication or adjustment necessary.

Operated by cranemen only, requiring no ground men. Load cannot be released until placed at rest and tongs dropped. Tongs cannot be released when carrying loads.

Design of grips varies according to the load to be carried. Special types designed for handling special products. Write for details and prices.

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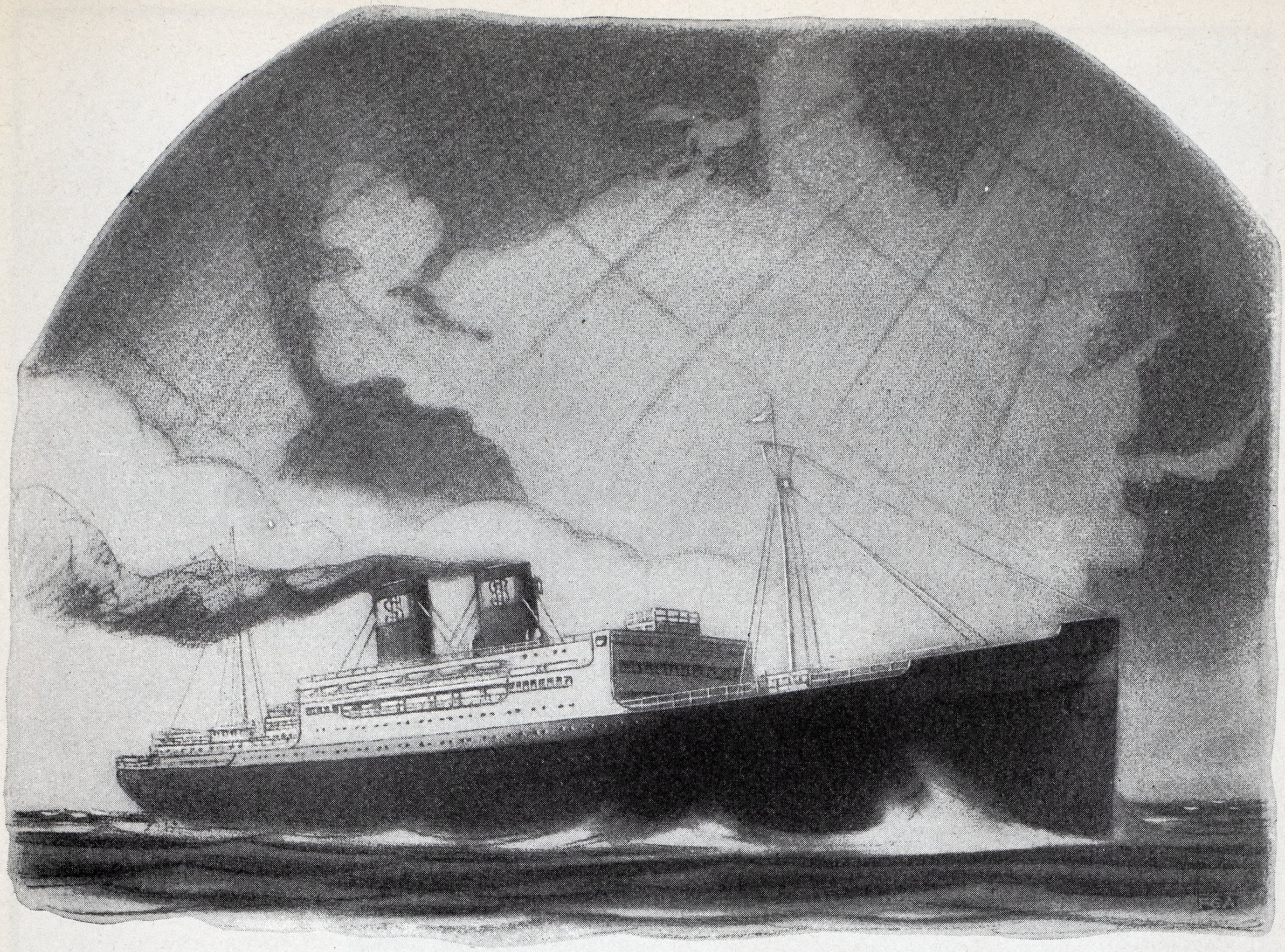
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HEPPENSTALL



Cruising the Seven Seas

with turbine electric drive

THE widespread adoption of turbine electric drive by prominent steamship companies is sufficient proof of its established position as an efficient, economical and reliable type of propulsion for commercial use.

The Dollar Steamship Line, one of the oldest and most prominent of American shipowning companies, recently has ordered two new liners for their round-the-world service, each of which will be driven by turbine electric equipment of 26,500 shaft horsepower. The selection of this type of propulsion for a service, which for long periods of time will place the ship almost entirely on her own resources for repairs, pays tribute to the confidence of the shipping industry in the reliability of this class of propelling equipment.

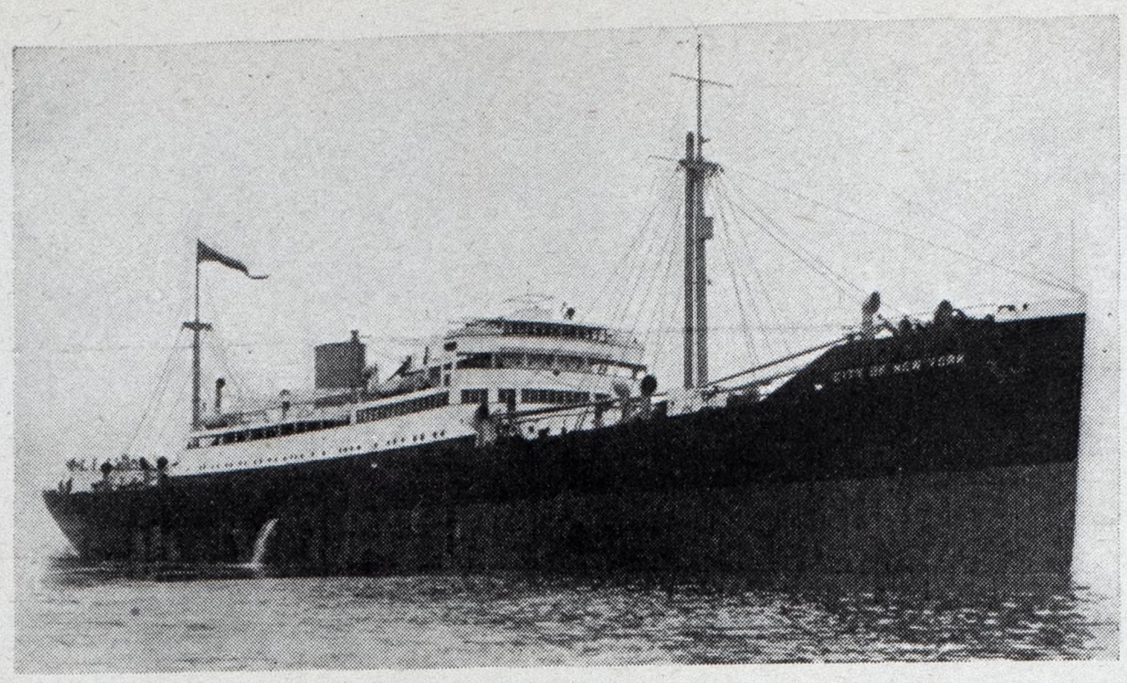
The main turbine generators, the propelling motors for the twin screws, and the control of the propelling machinery, as well as the motors and control of the completely electrified deck and under-deck auxiliaries for one of these ships, will be supplied by Westinghouse.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH PENNSYLVANIA

SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES

Westinghouse

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DEPENDABILITY is an over-worked word, but—
in emergency dependability must be a FACT.

THAT is why the American South African Line
and Sun Shipbuilding and Dry Dock Co. selected
for the "City of New York"

A STANDARD DIESEL EMERGENCY GENERATOR

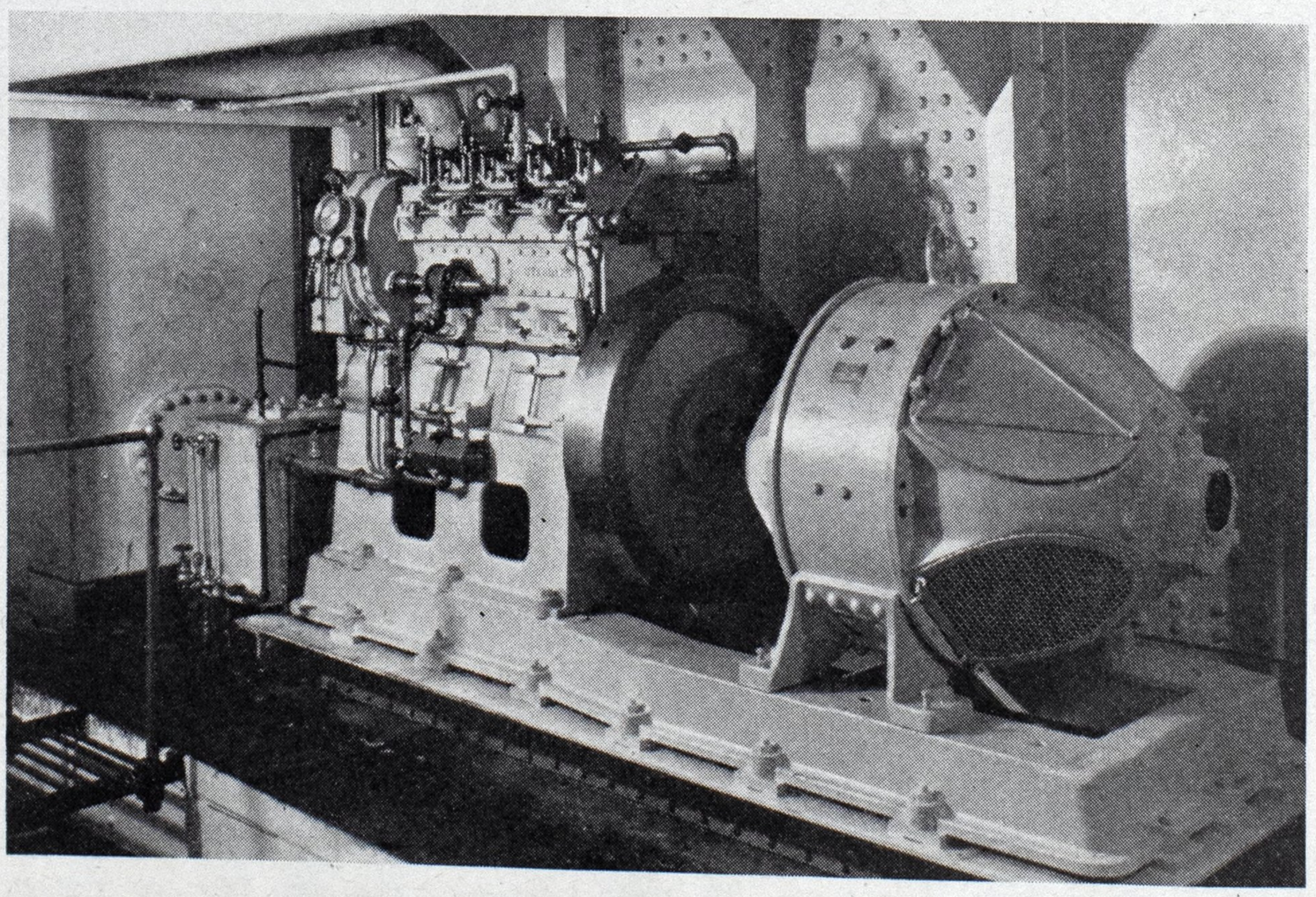
It Is Reliable **It Is Smooth**

**It Uses The Same Fuel As The
Sun-Doxfords That Drive The Ship**

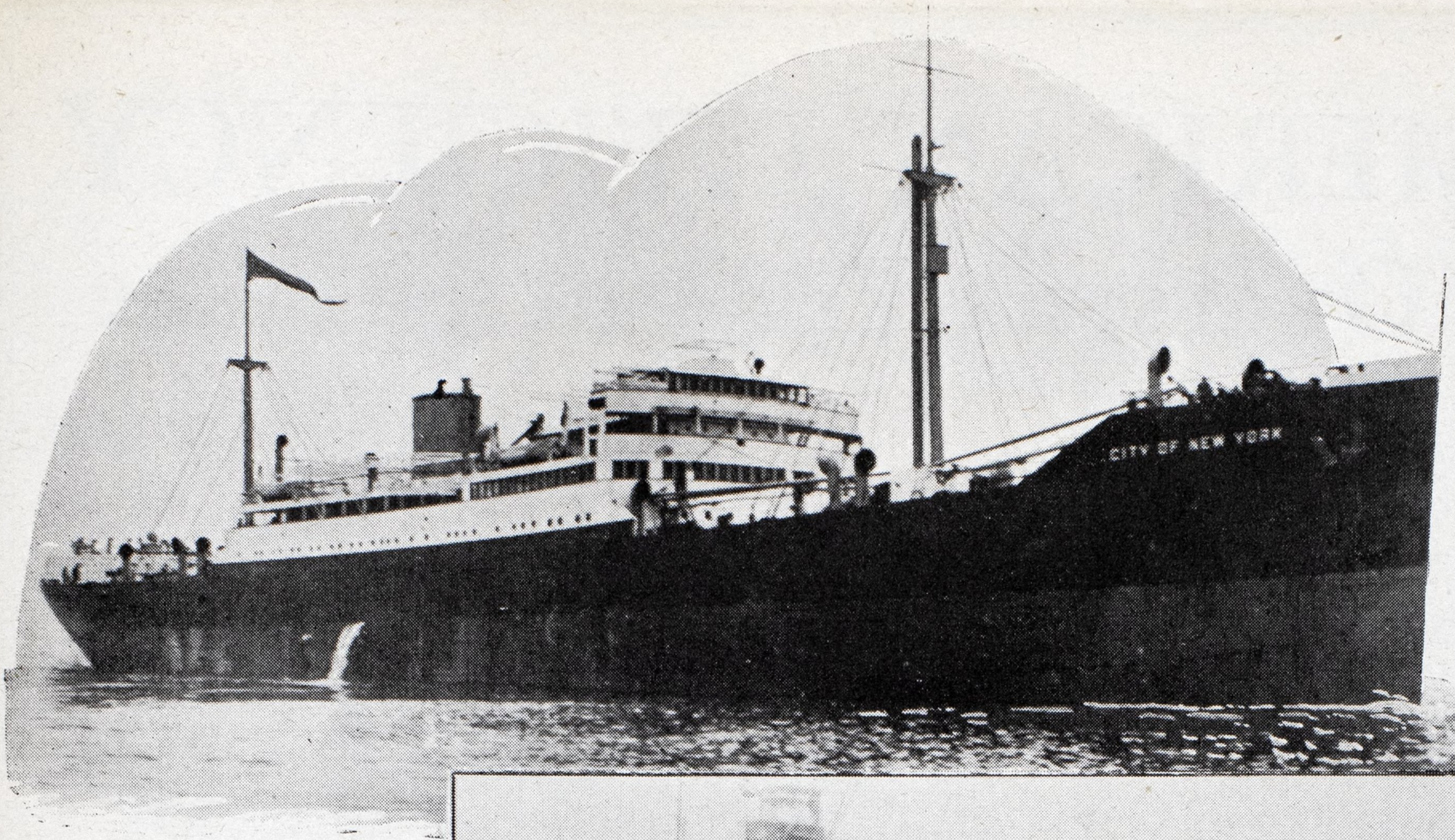
Let Us Quote You

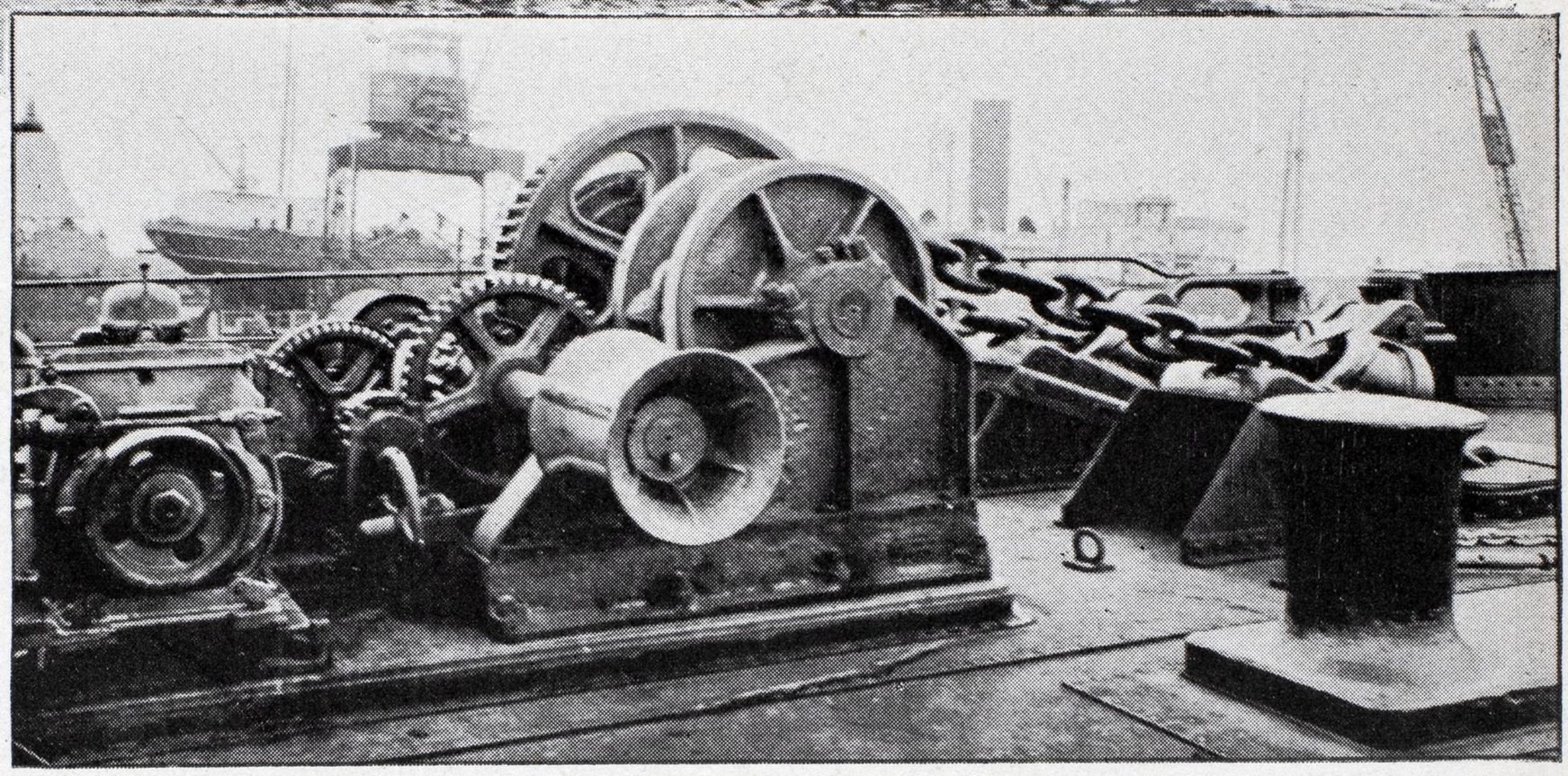
STANDARD MOTOR CONSTRUCTION CO.

184 Whiton Street, Jersey City, N. J.



DIESEL GENERATING SETS

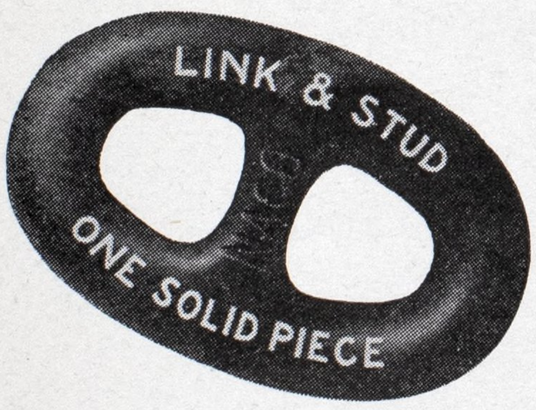




NACO on the City Of New York

The specification of 300 fathoms of Naco 2½ inch Anchor Chain Cable for the City Of New York, indicates that the safety equipment of this new motor ship, which is the first of a fleet of vessels to be built for the American South African Line, will be the most modern and best obtainable.

Naco Anchor Chain assures this splendid motor ship the greatest protection, in emergency, afforded by an Anchor Chain.



NACO Anchor Chain Links are absolutely uniform in size and shape and are made in one piece, free from welds.

Write for Information

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Office—Cleveland, O.

NACO CAST STEEL CHAIN
The Strongest Chain Made
TRADE MARK

AMERICAN EFFICIENCY
in Overseas Freight Service

*AMERICA FRANCE LINE
42 Broadway, New York City
N. Atlantic to French Atlantic ports

*AMERICAN BRAZIL LINE
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*AMERICAN DIAMOND LINES
39 Broadway, New York City
North Atlantic Ports to Holland and Belgium

DIXIE UK LINE
New Orleans, La.
New Orleans to United Kingdom

*AMERICAN PIONEER LINE
11 Broadway, New York City
North Atlantic ports to Orient, India and Australia
Periodically this line conducts an around-the-world service via the Suez Canal

DIXIE MEDITERRANEAN LINE
New Orleans, La.
New Orleans to Mediterranean ports

MISSISSIPPI VALLEY EUROPEAN LINE
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New Orleans to French and Belgian ports

YANKEE LINE
110 State Street, Boston, Mass.
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GULF WEST MEDITERRANEAN LINE
917 Whitney Building, New Orleans, La.
Gulf and South Atlantic ports to Portuguese, Spanish, and North African ports (west of Bizerta)

MOBILE OCEANIC LINE
Mobile, Ala.
Mobile and Eastern Gulf ports to United Kingdom and Continental European ports

AMERICAN GULF ORIENT LINE
917 Whitney Building, New Orleans, La.
Gulf ports to Orient and Dutch E. I.

AMERICAN REPUBLICS LINE
33 Broad Street, Boston, Mass.
N. and S. Atl. ports to Brazil and River Plate ports, east coast of S. America

ORIOLE LINES
Citizens Natl. Bank Bldg., Baltimore, Md.
North Atlantic ports to west coast of United Kingdom and Irish ports

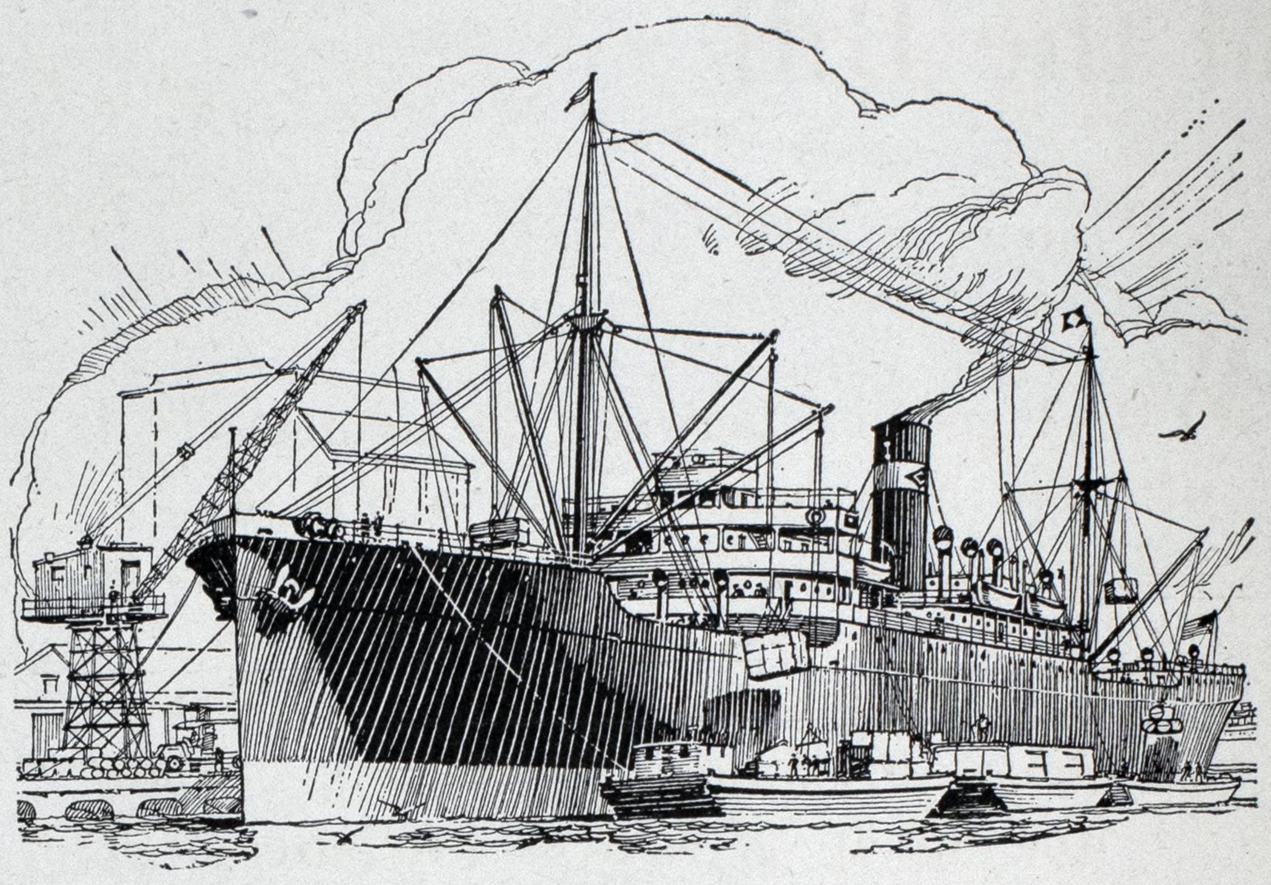
SOUTHERN STATES LINE
925 Whitney Central Building, New Orleans, La.
New Orleans and Texas ports to German and Holland ports

TEXAS MEDITERRANEAN LINE
Cotton Exchange Bldg., Galveston, Tex.
Texas ports to Mediterranean ports

TEXAS UKAY LINE
Galveston, Texas
Texas ports to United Kingdom ports

TEXAS STAR LINE
New Orleans, La.
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**Accommodations available for a limited number of passengers on these lines.*



THE new American Merchant Marine has brought a new conception of business-like efficiency to overseas freight transportation. The speedy ships and well trained personnel of this modern merchant armada provide American manufacturers and producers with dependable world-wide shipping services *under their own flag*.

The new American Merchant Marine is made up of the hundreds of sturdy vessels in the 17 lines owned by the United States Shipping Board and those in the many other lines developed by the Shipping Board but now under private ownership. Sailing on regular schedule between Atlantic, Gulf and Pacific ports and ports in practically every part of the world, these ships are equipped to handle cargoes of all kinds.

A distinct advantage available to users of the Shipping Board lines is found in the advisory service of their experienced American operators. These experts will be glad to help you solve any transportation problems. Write for full information.

UNITED STATES SHIPPING BOARD
MERCHANT FLEET CORPORATION
WASHINGTON, D.C.

Between the Bid and the Bill—

WHAT goes on between the tender of a bid and rendering of a bill is what counts in the repair of a ship.

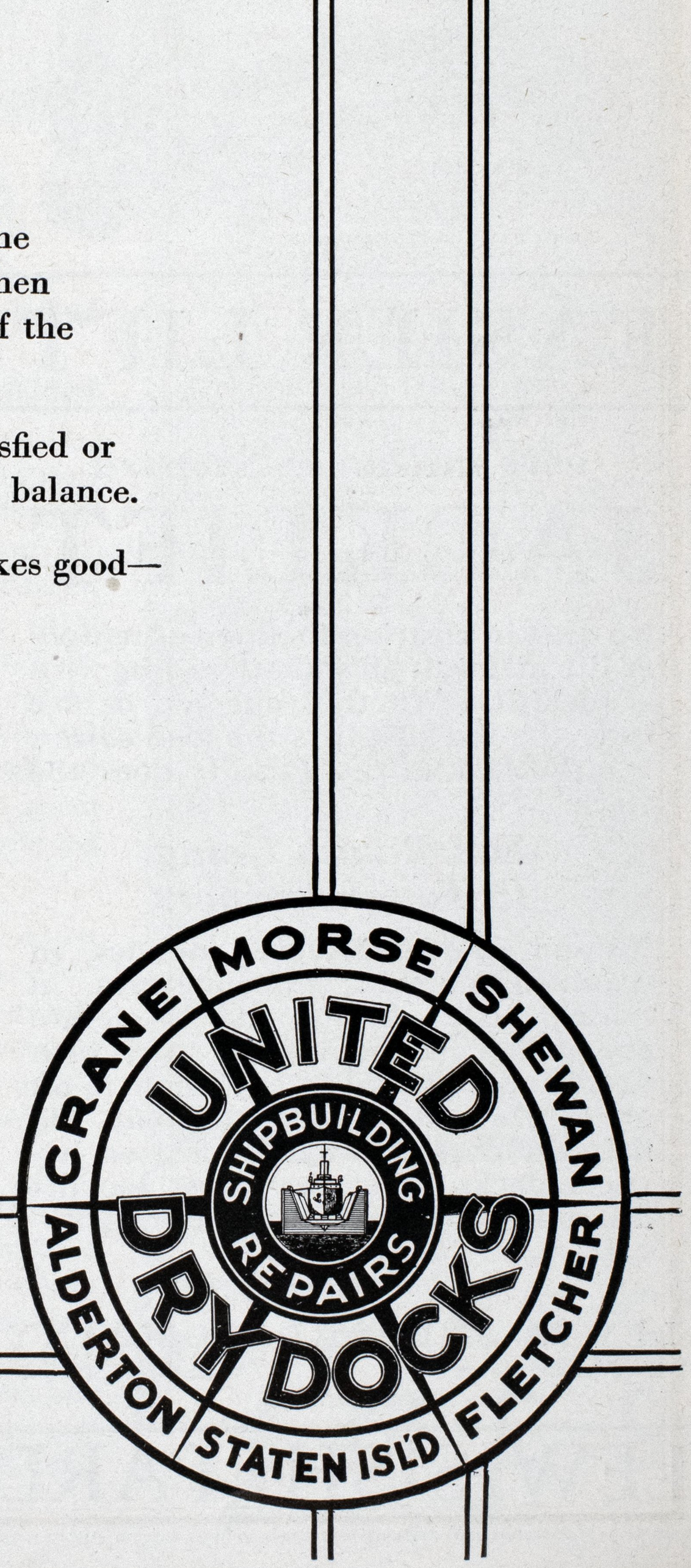
That's the important period—when the job is just done or is well done—when the spirit as well as the letter of the contract is fulfilled.

It is then that the client is satisfied or not—when reputation is in the balance.

In short—it is SERVICE makes good—or falls down.

United Service is Superior Service

11 Broadway DIGby 0500



HIGHER LIFT

"it's all smooth sailing with a JACKLIFT"



EASIER LIFT

with the Lewis-Shepard

JACKLIFT

No drag in clearing inclines—the *higher* lift makes it all smooth sailing with a Jacklift. Whether one ton or five tons the Jacklift lifts the load *easier*. It's the Jack in the Jacklift does the work.

For Rough Going In Tough Corners

'Round stanchions, over inclines, in cramped quarters, up gangways, in narrow aisles—always able to elevate the load or manoeuver the truck with the handle swung to any angle in an arc of 270°. And that's a great, big help on dock, in warehouse, or between decks. Get the latest Jacklift line-up—prices and service are right.

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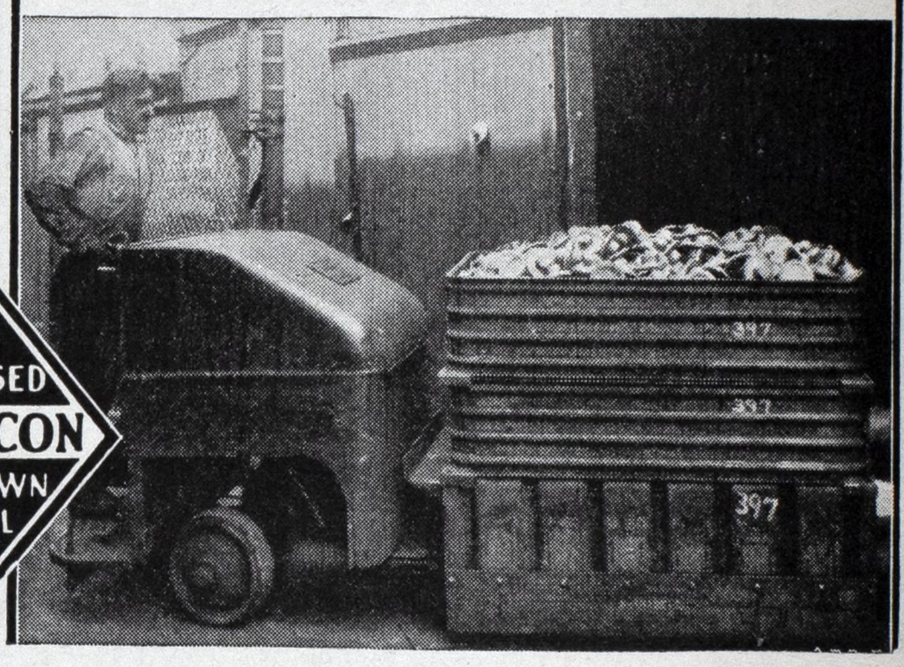
TRUSCON

TRUSCON STEEL CO.

STEEL BOXES AND SKID PLATFORMS

Shipments are handled with less labor and in quicker time where Truscon Steel Boxes, Skid Platforms and Trucks are used. They are furnished in types and sizes to meet every condition. Our engineers will give full information and useful suggestions.

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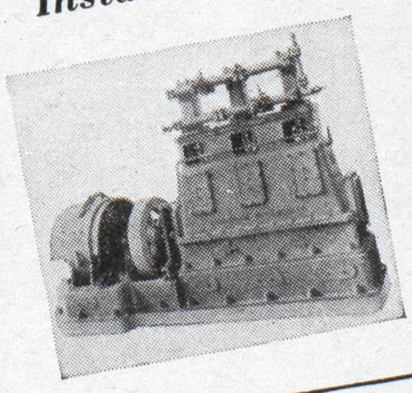


PRESSED TRUSCON & DRAWN STEEL

Yours for the Asking

Write to our Marine Department at New Brunswick, N. J., asking for a free copy of the article "Refrigeration Equipment on the S. S. *California*." It gives an interesting description of the installation of Brunswick-Kroeschell Refrigeration on the largest American built ship. Similar Brunswick-Kroeschell installations serve the *Virginia* and the new *Pennsylvania*, sister ships to the *California*.

"The Standard for All Marine Installations"



BRUNSWICK-KROESCHELL COMPANY
Refrigerating & Ice Making Machinery
NEW BRUNSWICK, N.J. - CHICAGO, ILL.
BRANCHES, AGENCIES AND SERVICE IN PRINCIPAL CITIES



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American service on the North Atlantic is complete and highly efficient. You can cross direct to England, Ireland, France and Germany in a United States Liner that upholds the finest traditions of American culture, comfort, service and luxury. You can go first class, second class, cabin, tourist third or third. Above all, you will get full value for your money . . . amazingly full . . . value in tune with the American concept of value.

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Thus, when you go abroad—or ship overseas—consult the management that offers marvelous transportation in these fine ships: Leviathan, World's Largest Liner; George Washington, America, Republic, President Harding and President Roosevelt—five magnificent cabin liners; and five splendid ships of the American Merchant Lines—American Shipper, American Banker, American Trader, American Farmer and American Merchant, which provide weekly sailings New York to London.

UNITED STATES LINES

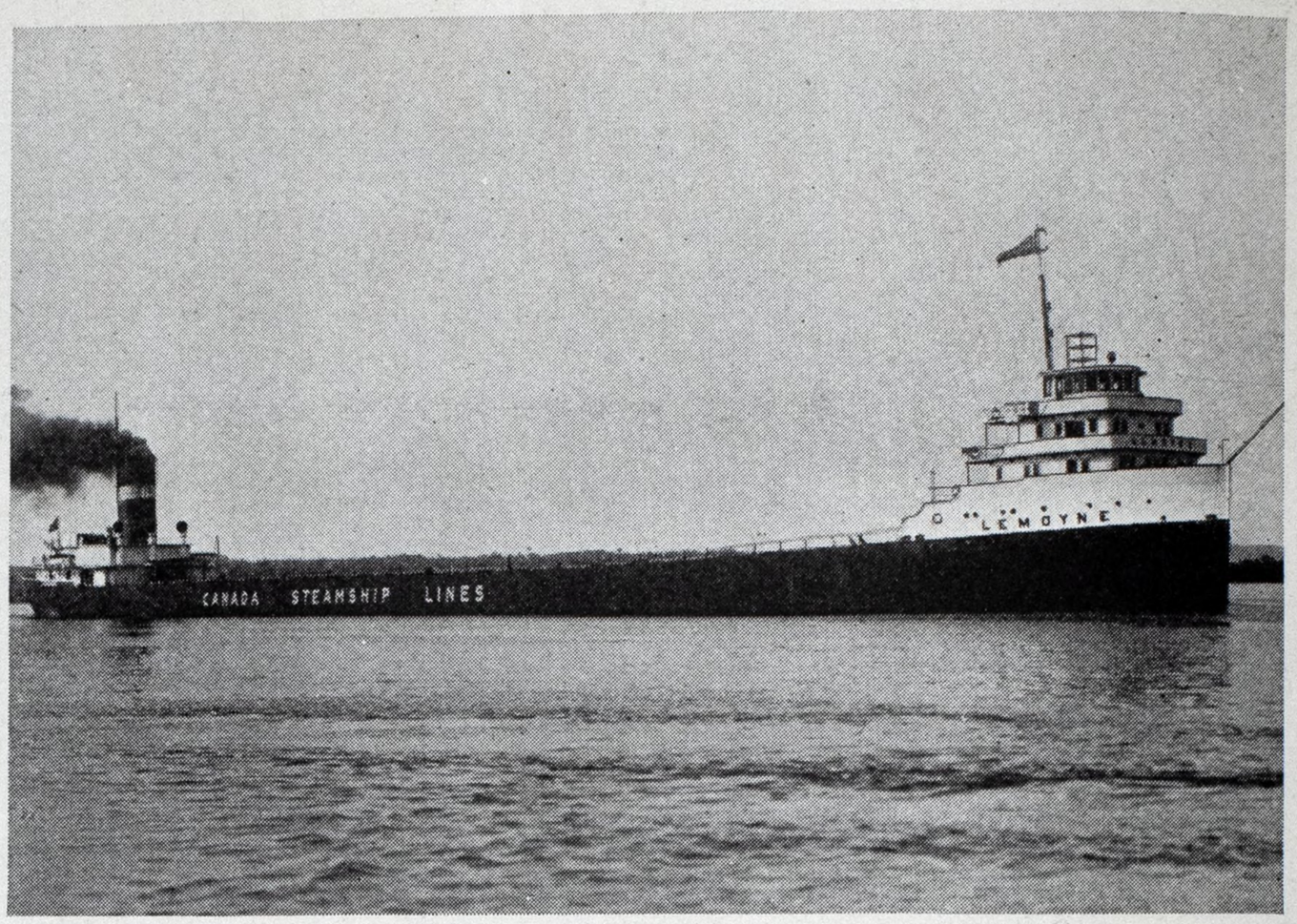
45 Broadway, New York, N. Y.

SS "LEMOYNE"

Record-breaking bulk freighter of the Upper Lakes was built by

Midland Shipbuilding Co.,

Midland, Ont.

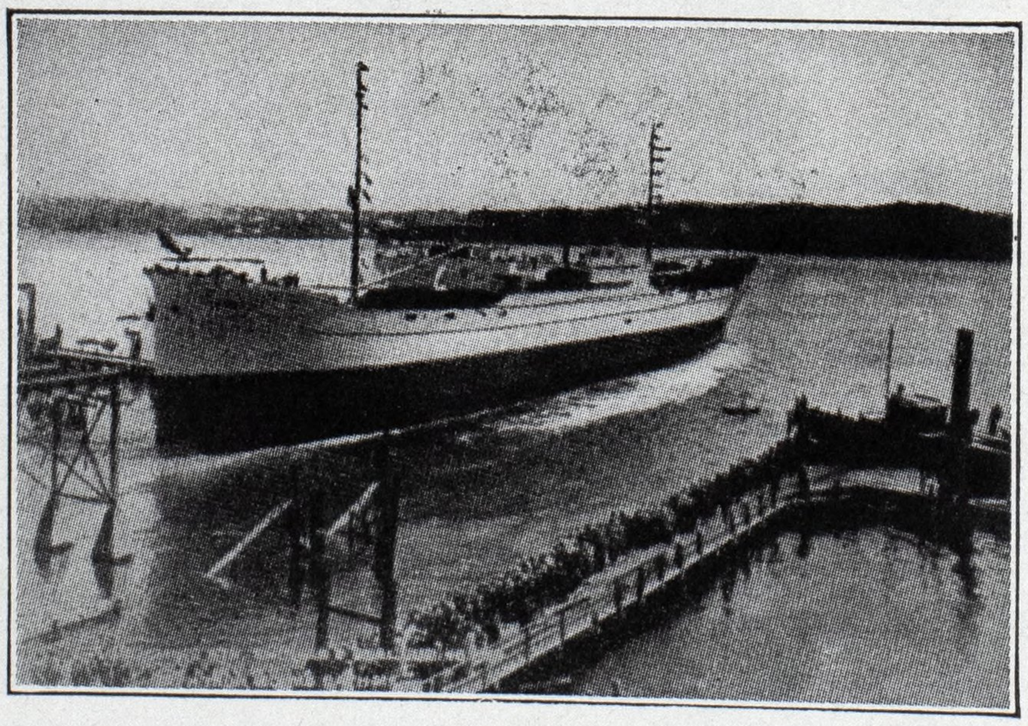


From the yards of the Midland Shipbuilding Co., have been launched some of the greatest bulk freighters and package freighters now operating on the Great Lakes. SS "LEMOYNE" holds world records for Rye, Wheat, Mixed Grains and Coal. Midland Shipbuilding Company is owned by

CANADA STEAMSHIP LINES

BATH IRON WORKS

Launching 425 ft. steel Steamship



Years of experience in design and building water craft, have won for Bath Iron Works an enviable reputation. Sound materials straight thru, expert designing, conscientious workmanship—these are features of every vessel that leaves the docks of the Bath Iron Works.

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Inquiries Solicited

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SHIPBUILDERS AND ENGINEERS

BATH, MAINE, U. S. A.

LOS ANGELES

SHIPBUILDING & DRYDOCK CORPORATION

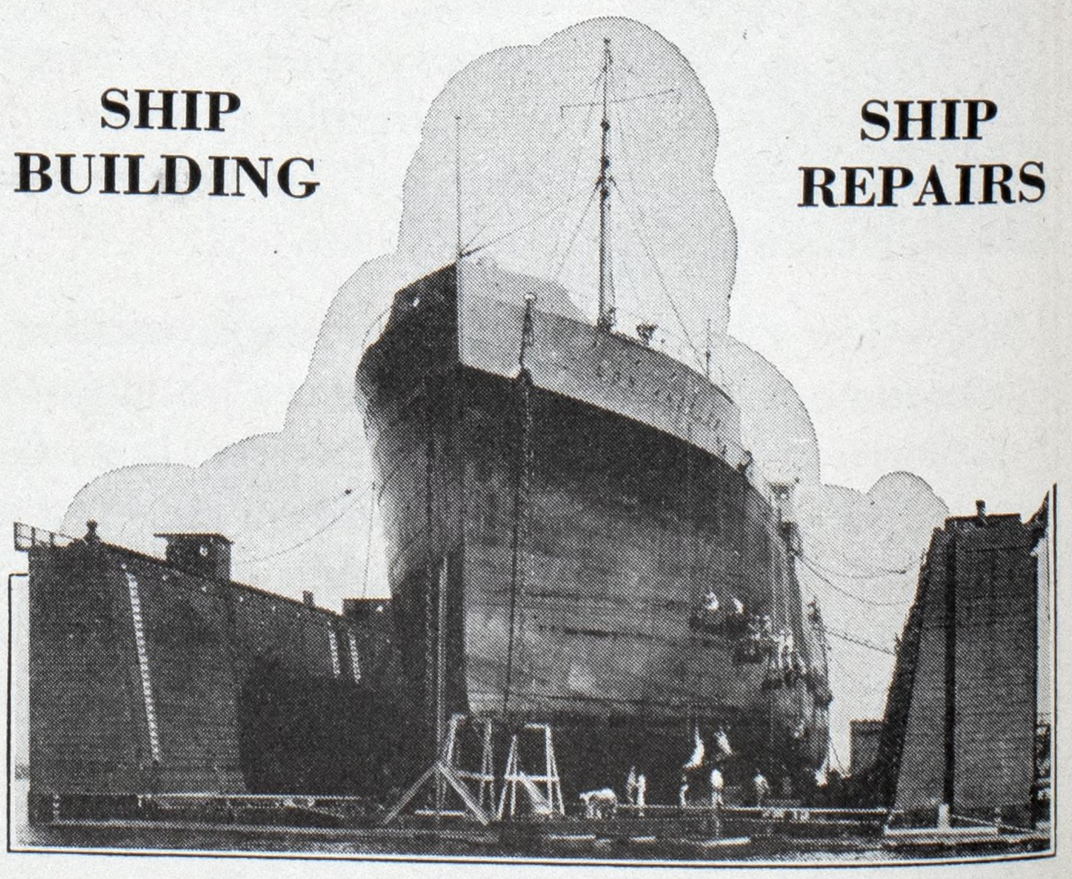
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40 Acres of Modern Shipbuilding Equipment To Meet Every Requirement

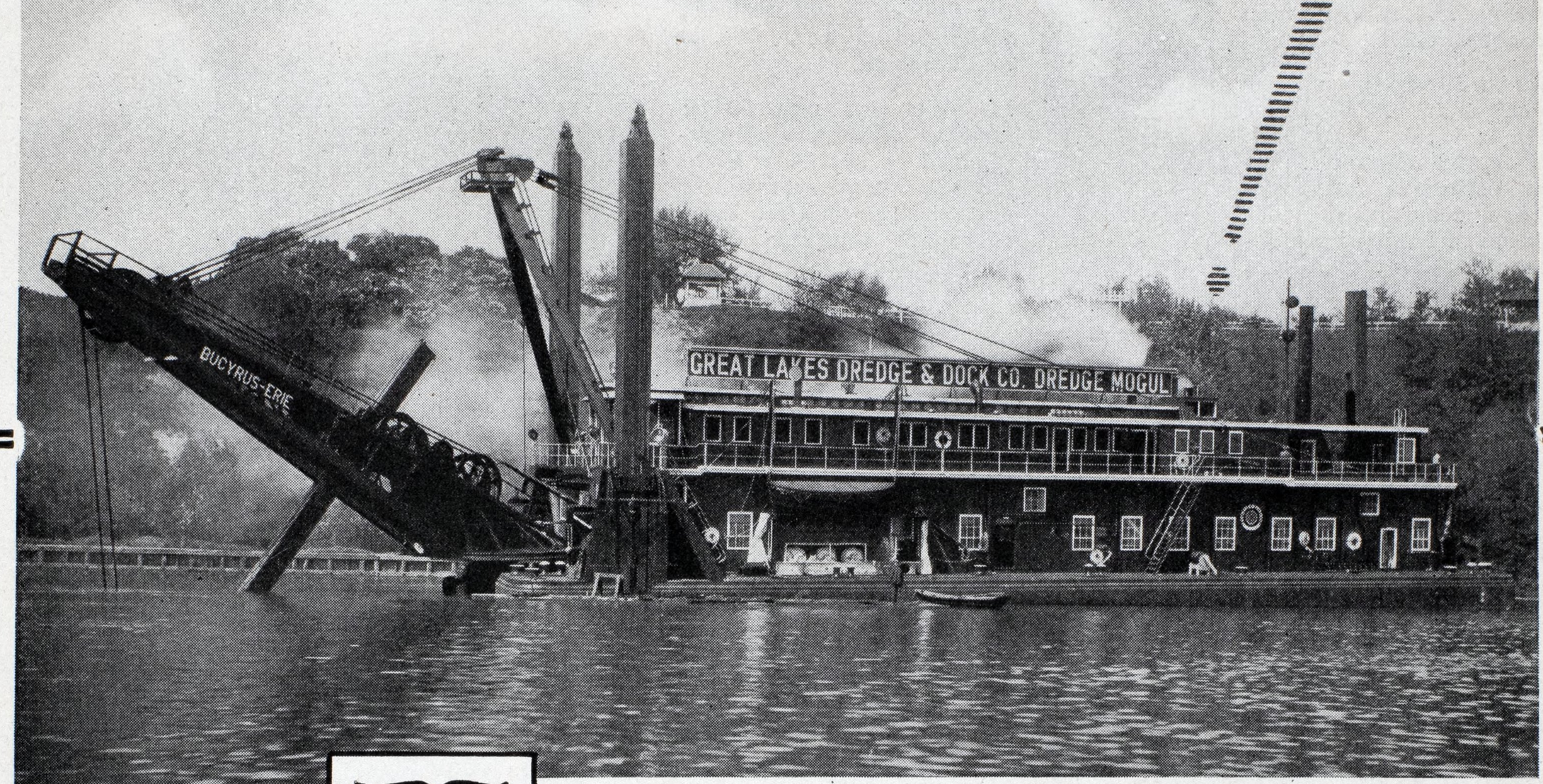
Floating Drydock—12,000 Tons Capacity

SHIP BUILDING

SHIP REPAIRS



Another MANITOWOC PRODUCT



THE 8 cu. yd. Diesel Electric Dipper Dredge MOGUL was built for Great Lakes Dredge & Dock Co., Chicago. It is equipped with a 12 cu. yd. dipper for ordinary work but will heap up to a load of 16 yards in lighter materials. An 8 cu. yd. dipper is used for dredging rock. Maximum digging depth is 42 ft. of water. The MOGUL is 156'0" x 42'6" x 12'8"—1200 H.P., equipped with Bucyrus-Erie dredging machinery and Busch Sulzer Diesel engine. It has living quarters for a crew of twenty-three men.

It will pay you to consult Manitowoc when in the market for dredges, steel passenger and freight vessels, carferries, tankers, fire boats, sand suckers, tugs, scows, lighters, marine engines, marine boilers, ship auxiliary equipment, etc.

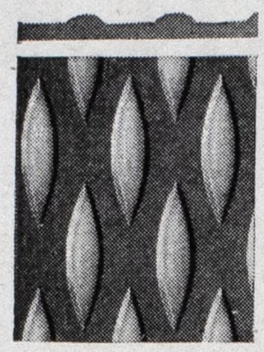
MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wisconsin

On The "Hi-Esmaro" . . . . . Engine Room Flooring of "A.W." Rolled Steel Floor Plate

THE "Hi-Esmaro", launched a few months ago, is one of the finest American-built Diesel yachts afloat. In keeping with the general excellence of her design, "A.W." Diamond Pattern Rolled Steel Floor Plate was selected for the engine room flooring and for the runways around the two Bessemer Diesels with which she is powered.

For under-foot surfaces aboard ship, "A.W" Floor Plate is ideal. Its raised, oval-shaped diamond pattern, distinctive and pleasing in appearance, provides traction and anti-slip qualities under every condition.



Standard A.W. Diamond (¼ size)

Moreover, the pattern is self-draining from every angle, having no pockets to hold oil or water or to obstruct drainage.

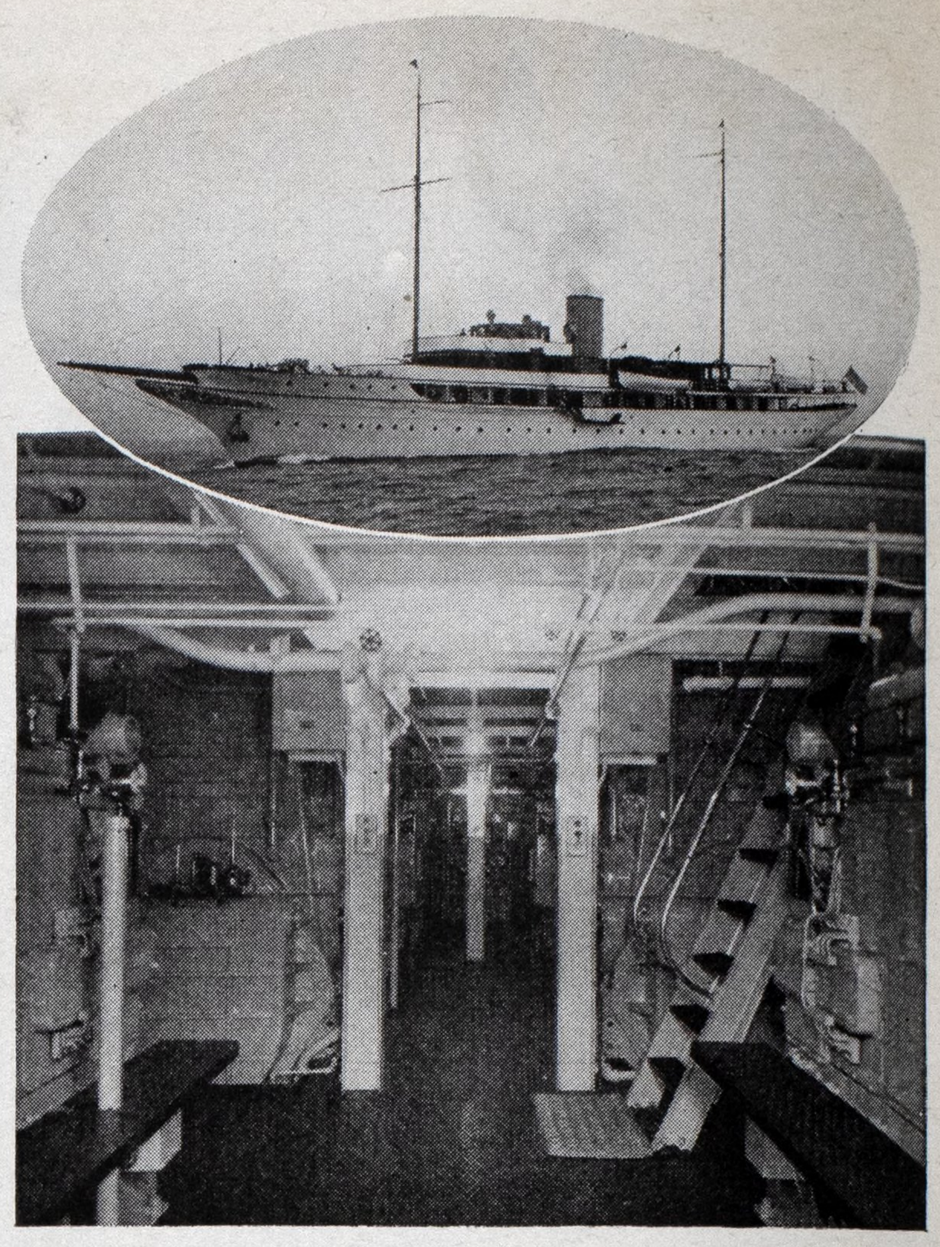
In addition, "A.W." Floor Plate gives many years of service without maintenance or repair. It is rolled from carefully-selected steel, which resists wear, shocks and abrasion.

If you are not fully familiar with the advantages of "A.W." Floor Plate for under-foot surfaces aboard ship, send for samples and complete data. Write today.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa.

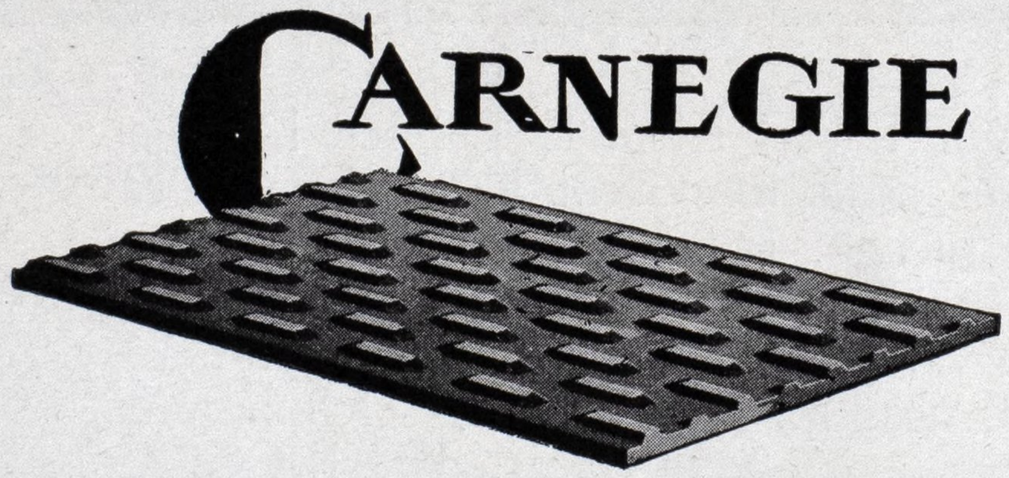
Philadelphia New York Boston Dallas
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In the engine room of the "Hi-Esmaro", designed by Henry J. Gielow, Inc., and built by Bath Iron Works, "A.W." Diamond Pattern Rolled Steel Floor Plates are installed.

"A.W." *Diamond Pattern Rolled Steel* FLOOR PLATE

CARNEGIE FLOOR PLATE



Section M-41
Thickness—$\frac{3}{16}$" to ¾" exclusive of raised figure.
Width —6" to 66".
Weight —8.8 to 31.7 pounds per square foot.
Recommended for floors, sidewalk openings, stair and traffic treads, where a safe, secure foothold is required. This design drains and cleans easily.

CARNEGIE STEEL COMPANY

Subsidiary of UNITED STATES STEEL CORPORATION
CARNEGIE BUILDING, PITTSBURGH, PA.

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If you plan changing your address make sure the new address is sent by the 15th of the month to Marine Review, Penton Building, Cleveland. Include your old address when sending your new one.

Name..... Old Address.....

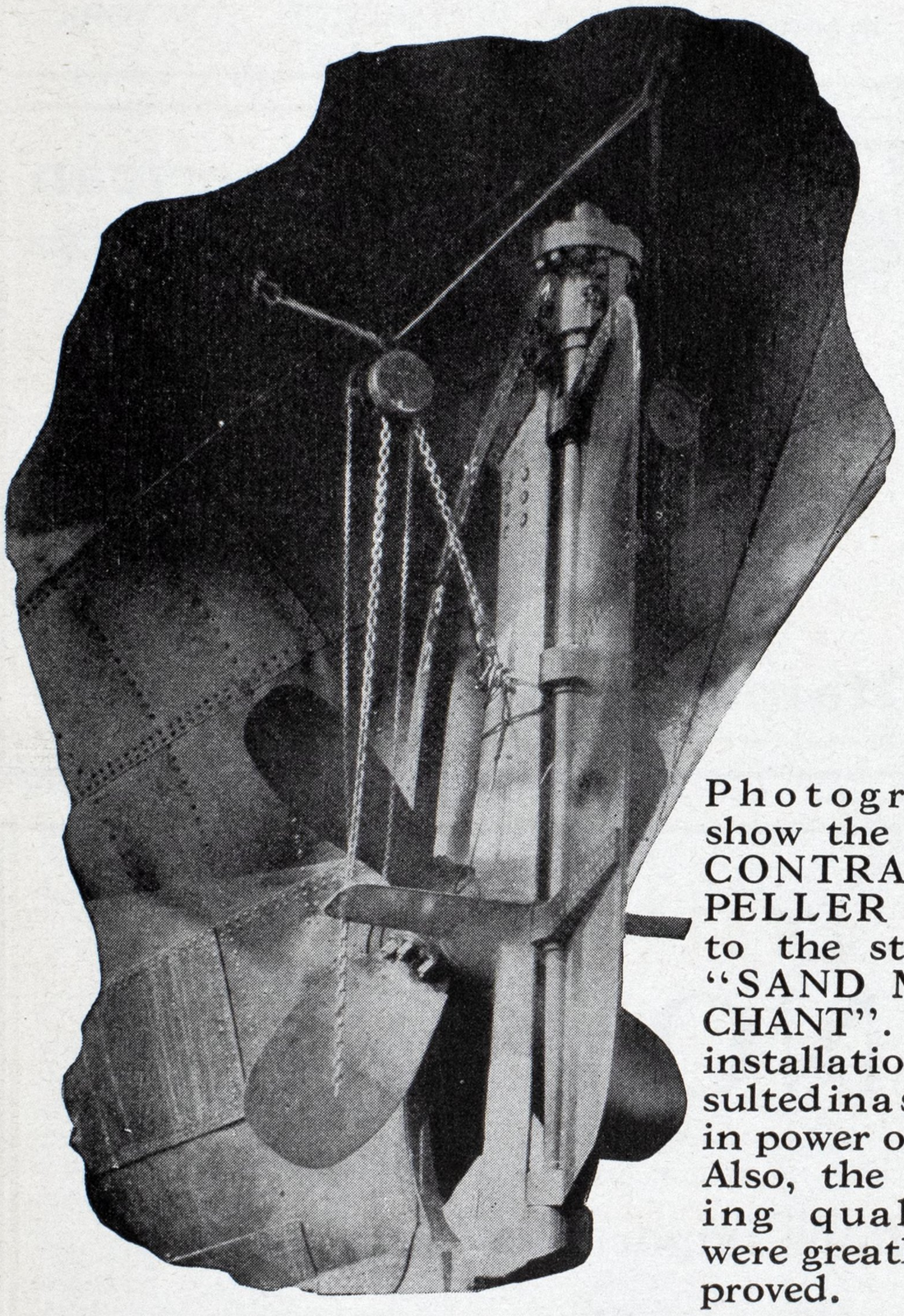
New Address.....

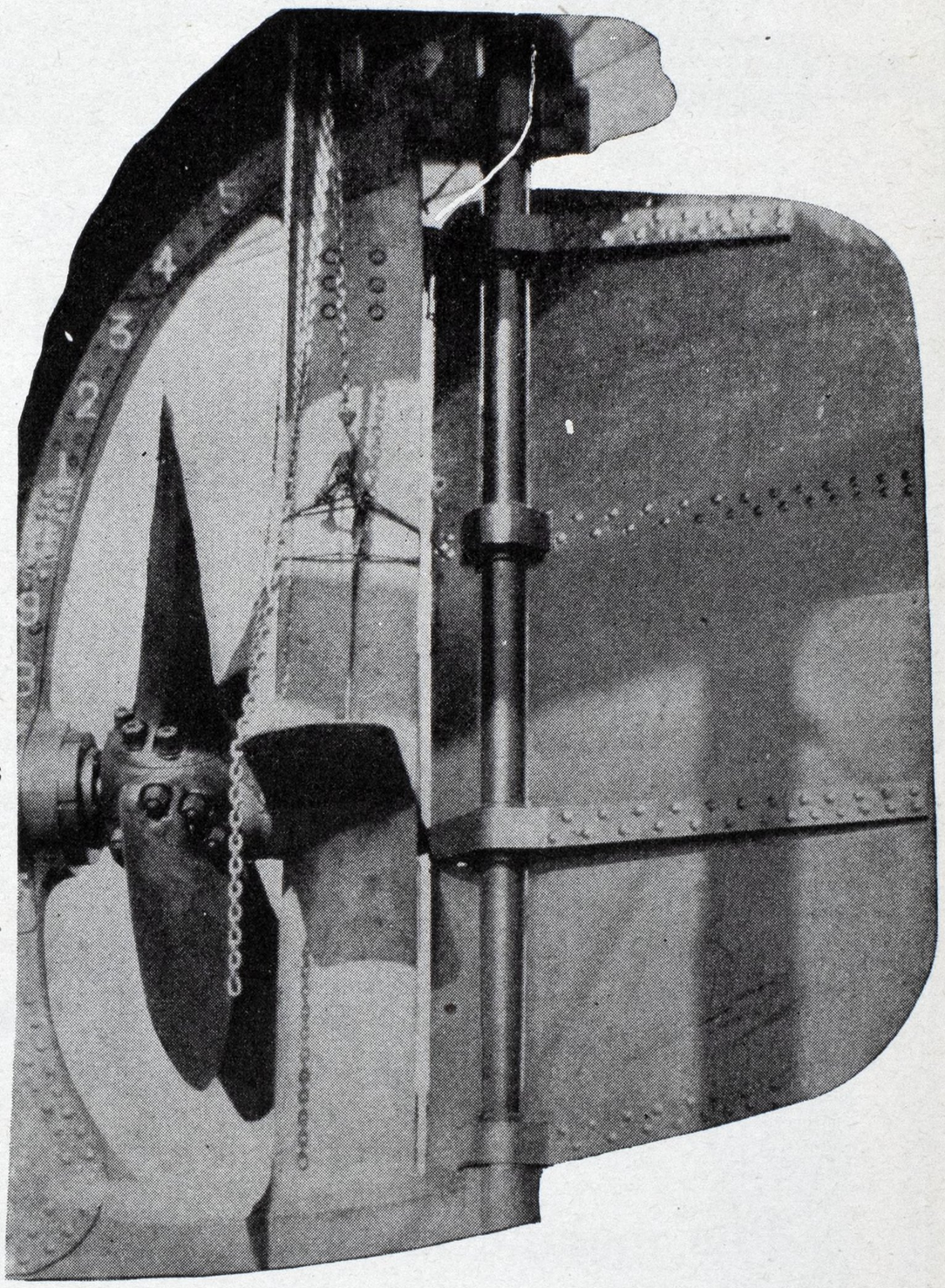
.....Position .....Company

Collingwood Shipyards Limited

Collingwood, Ontario

Sole Licencees for Canada— for Star Contrapropellers and Rudders





Photographs show the STAR CONTRAPROPELLER fitted to the steamer "SAND MERCHANT". This installation resulted in a saving in power of 12%. Also, the steering qualities were greatly improved.

STAR CONTRAPROPELLERS have been fitted to 425 vessels representing 2,577,181 tons with an aggregate of 1,035,493 I. H. P.

The main advantages are:

Saving in power of from 10% to 15% for the same speed.
Increase in speed of from 5% to 10% for the same power.
Improved steering, which is important in handling ships in canals and narrow waterways.

Reduction in vibrations.
The Contrapropeller is applicable to all types of vessels.

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"The Dean of Pumps on Land and Sea"

Single Style & Duplex
Piston Type & Plunger

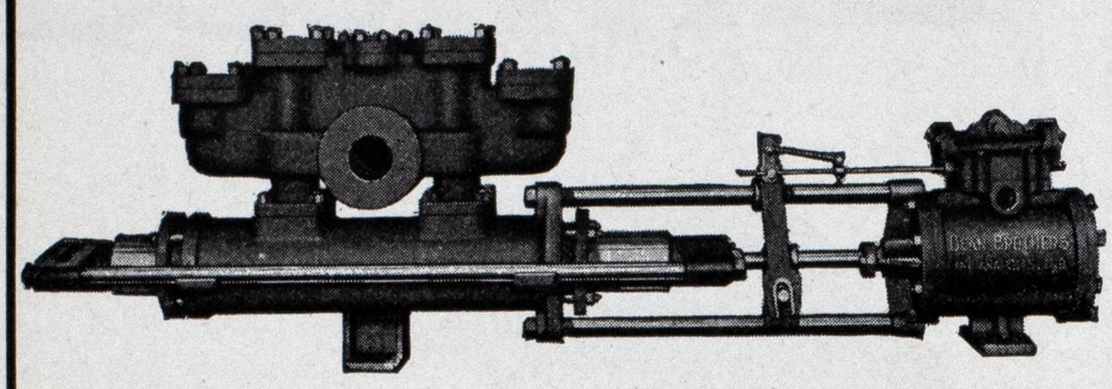


Figure No. 2311 Horizontal Single Style Double Acting Outside End Packed Plunger Trombone Pot Valve Pump For Boiler Feed & Pressure Service.

ESTABLISHED 1869

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INDIANAPOLIS IND.

Star Brass Mfg. Co.

53 Oliver Street -::- Boston, Mass.

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Accurate "Non-corrosive" Pressure and Recording Gages, Revolution Counters, Marine Clocks.

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Hamburg-American Line

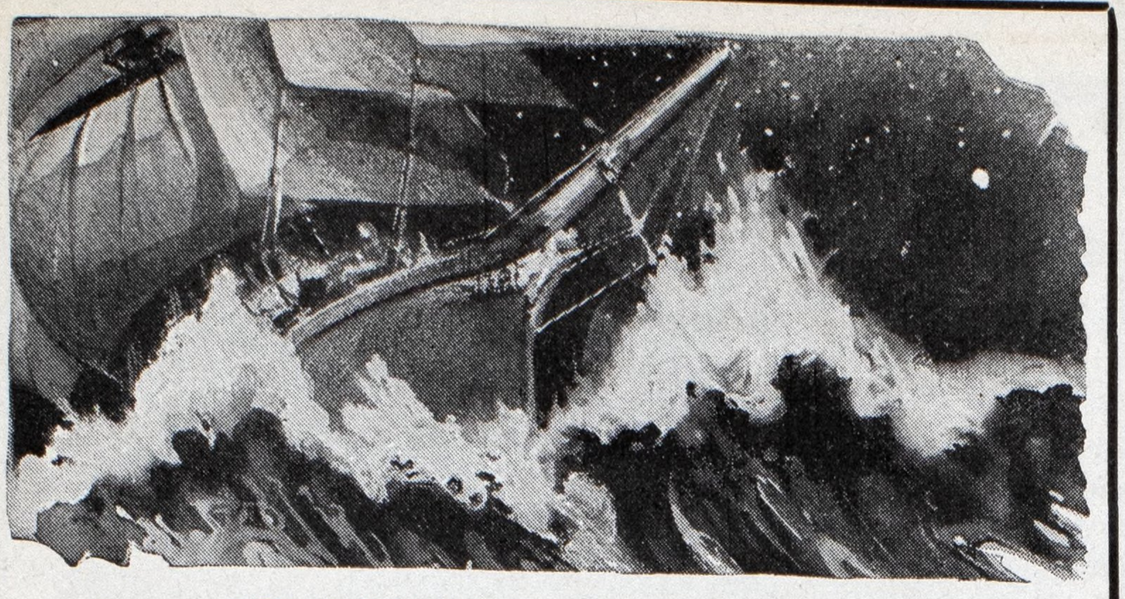
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Be sure to include Marine Review in your sales and advertising plans to reach the really important men who say yes, and O. K. requisitions in the marine trade.



"Who hath desired the sea?—
the immense and contemptuous surges?
The shudder, the stumble, the swerve,
as the star-splitting bowsprit emerges?"
RUDYARD KIPLING

DOWN plunges her nose, buried in stormy seas. Waves pound her sides, and break swirling over decks. Lee scuppers under. Yet on she goes, riding the waves without fear, deck and side seams right-caulked with

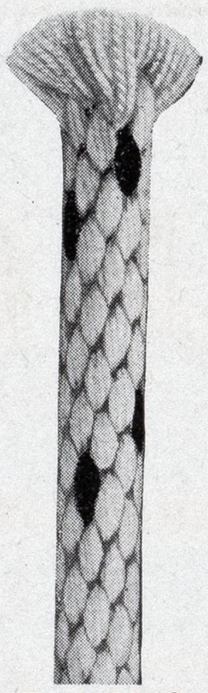
STRATFORD OAKUM

Sailormen like Stratford Oakum—they know it and use it. And so did their granddads, nearly a hundred years ago. They knew, as you will know, that there is only one oakum to use, and it is Stratford.

Do not accept a substitute, there is none "just as good."

George Stratford Oakum Company
JERSEY CITY, NEW JERSEY
Also manufacturers of cotton wiping waste

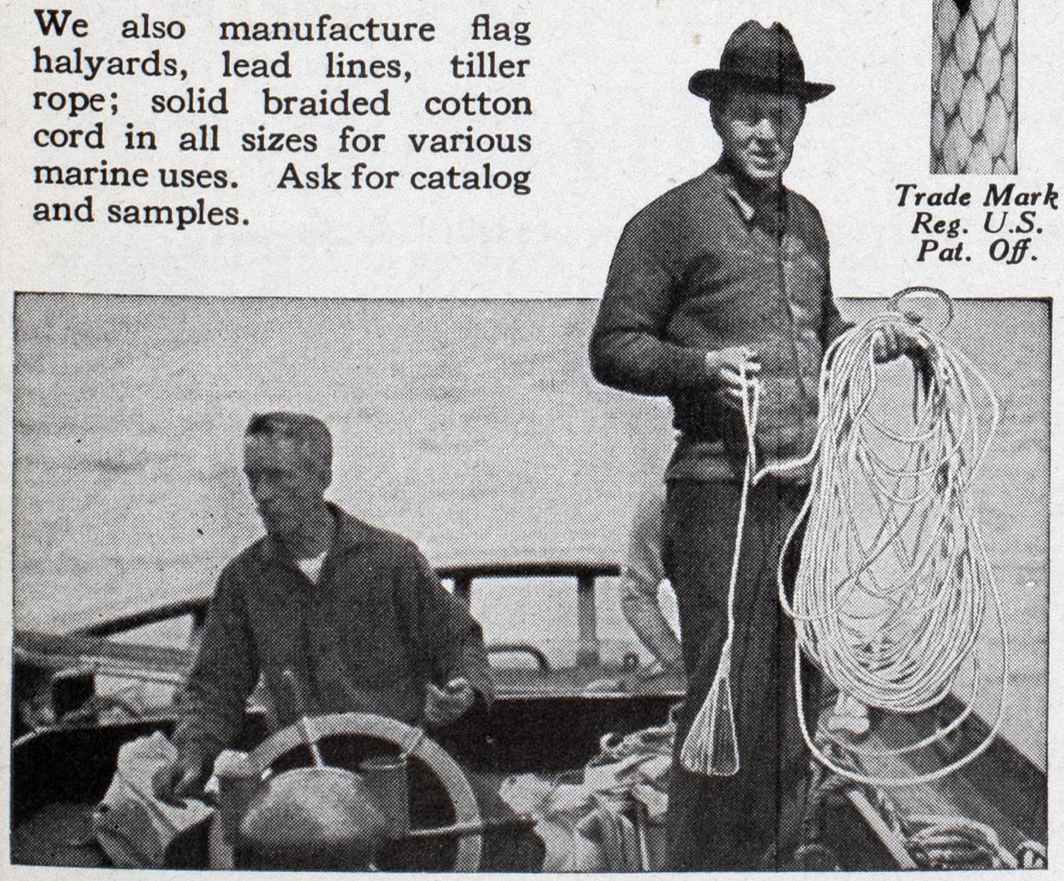
SAMSON SPOT
Log Lines



Smooth, tough and durable; no adulterating material to stiffen it and decrease strength and durability. Solid braided of extra quality cotton yarn. Uniform in size and quality. Easily identified by the colored spots, our trade mark.

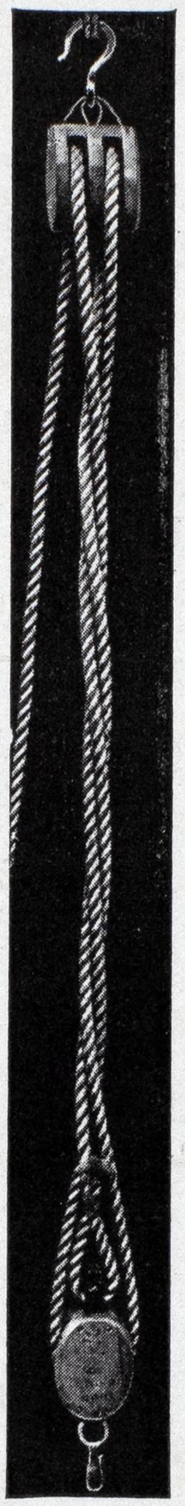
Trade Mark Reg. U.S. Pat. Off.

We also manufacture flag halyards, lead lines, tiller rope; solid braided cotton cord in all sizes for various marine uses. Ask for catalog and samples.



SAMSON CORDAGE WORKS
88 BROAD STREET BOSTON, MASS.

WATERFLEX
VERSUS
ORDINARY



(1)

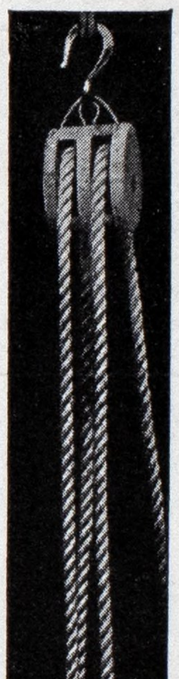
←Ordinary Rope—Wet

The adjoining photographic reproduction (1) illustrates a difficulty that is familiar to thousands of rope users. A tackle or block and fall, made with ordinary Manila rope, and allowed to become wet, is an extremely difficult thing to manage. The twisting, kinking and swelling of such cordage cause much waste of time and create a safety hazard. Unnecessary expense can be saved by avoiding old-fashioned rope for tackle use.

Waterflex Rope—"Wet"→

Tackle (2) was made up exactly similar to (1), with rope of the same size and lay,—but of Waterflex construction. Both "falls" were exposed to rain the same length of time and under the same conditions. The comparative result speaks for itself.

Experienced rope users naturally marvel at such an accomplishment, and many of them have become enthusiastic users of Waterflex at large annual savings in their rope costs.



(2)

WHITLOCK CORDAGE COMPANY
46 South Street, New York

Factory and Warehouses
Jersey City, N. J.

Branches
Chicago, Boston, Kansas City *and* Houston

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New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.

BATTERIES
Electric Storage Battery Co., The,
19th and Allegheny Sts.,
Philadelphia.

BINNACLES
Ritchie, E. S., & Sons,
Brookline, Mass.

BLOWERS (Flue)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.

BLOWERS (Motor Driven Ventilation)
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

BOATS (Steel and Wood)
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.

BOILER CONNECTIONS (Forged Steel)
Taylor Forge and Pipe Works,
1440 S. 49th St., Chicago, Ill.

BOILERS (Marine)
Almy Water Tube Boiler Co.,
184 Allen St., Providence, R. I.
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Babcock & Wilcox Co.,
85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Great Lakes Engineering Works,
River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
Oldman-Magee Boiler Works, Inc.,
36-40 Illinois St., Buffalo, N. Y.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Toledo Shipbuilding Co., Toledo, O.

BOILERS (Water Tube)
Almy Water Tube Boiler Co.,
184 Allen St., Providence, R. I.
Babcock & Wilcox Co., The,
85 Liberty St., New York City.

BOOKS (Technical)
Penton Publishing Co., Cleveland, O.

BROKERS (Vessel)
Boland & Cornelius,
Marine Trust Bldg., Buffalo, N. Y.
Farley, Edward P., & Co., Inc.,
11 Broadway, New York City.

BUNKER FUEL OIL—See FUEL OIL

BURNERS (Oil)—See OIL BURNING EQUIPMENT

CABLES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co.,
46 South St., New York City.

CALKING COTTON
Stratford, Geo., Oakum Co.,
165 Cornelison Ave.,
Jersey City, N. J.

CAPSTANS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Dake Engine Co.,
Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

CAR FLOATS
American Bridge Co.,
71 Broadway, New York City.

CASTINGS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Great Lakes Engineering Works,
River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.

CASTINGS (Iron)
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.

COMBINATION COUNTER AND TELLTALE
Cummings Machine Works,
255 Atlantic Ave., Boston, Mass.

COMPASSES
Ritchie, E. S., & Sons,
Brookline, Mass.

COMPASSES (Gyro)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

COMPRESSORS
Ingersoll-Rand Co.,
11 Broadway, New York City.

COMPRESSORS (Air)
Brunswick-Kroeschell Co.,
New Brunswick, N. J.

CONDENSERS
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Great Lakes Engineering Works,
River Rouge, Mich.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

CONTRAPROPELLER
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.

CONTRARUDDER
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.

CORDAGE
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works,
Boston, Mass.
Whitlock Cordage Co.,
46 South St., New York City.

DAVITS
Welin Davit & Boat Corp.,
3-5 Vernon Ave.,
Long Island City, N. Y.

DECKING COVERING
Selby, Battersby & Co.,
33rd & Arch Sts., Philadelphia.

DIE BLOCKS
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

DIE STEELS
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

DIESEL ENGINES—See ENGINES (Diesel)

DIESEL FUEL OIL—See FUEL OIL

DISTILLING APPARATUS
Griscom-Russell Co.,
285 Madison Ave., New York City.

DIVING APPARATUS
Morse, Andrew J., & Son, Inc.,
221 High St., Boston, Mass.

DRAFT (Artificial and Mechanical for Boilers)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Great Lakes Engineering Works,
River Rouge, Mich.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

DREDGING MACHINERY
Great Lakes Engineering Works,
River Rouge, Mich.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

DRINKING FOUNTAINS
Haydenville Co., The,
Haydenville, Mass.

DRY DOCKS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Great Lakes Engineering Works,
River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Maryland Dry Dock Co.,
Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.

DYNAMOS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St.,
St. Joseph, Mich.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

EJECTORS (Ash)
Great Lakes Engineering Works,
River Rouge, Mich.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

ENGINE SPEED INDICATORS
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

ENGINEERS (Marine, Mechanical and Consulting)
Canada Steamship Co.,
P. O. Box 2430, Montreal, Can.
Great Lakes Engineering Works,
River Rouge, Mich.
Todd Shipyards Corp.,
25 Broadway, New York City.
United Dry Docks, Inc.,
11 Broadway, New York City.

ENGINES
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester. Pa.

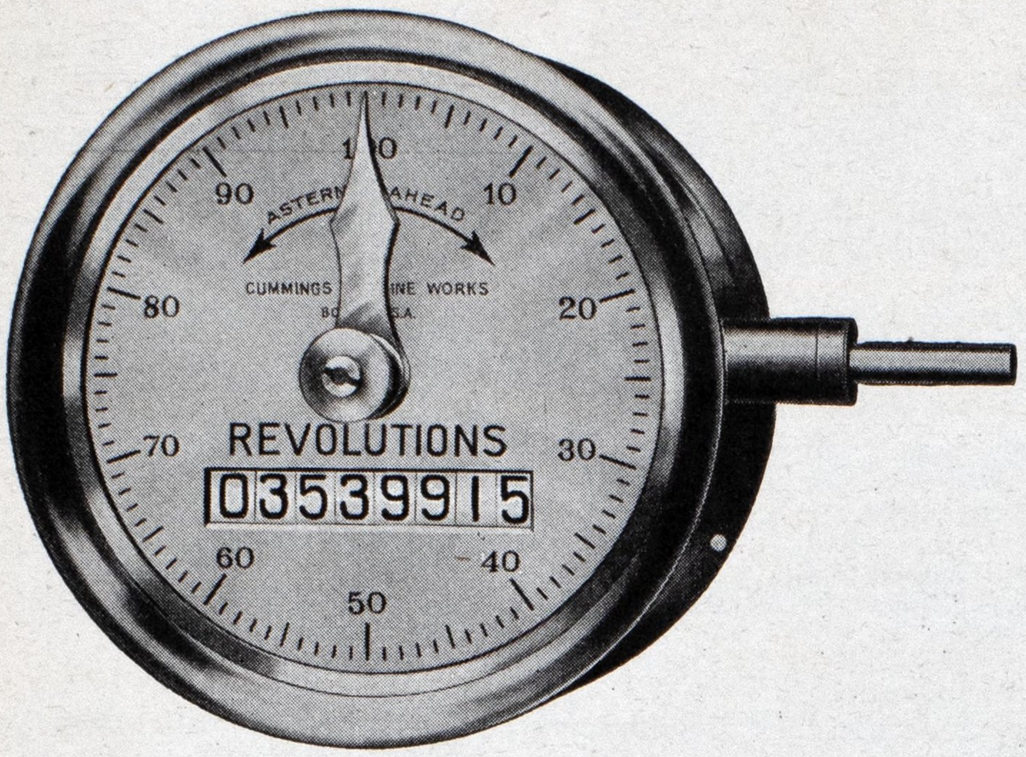
ENGINES (Diesel)
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.

ENGINES (Internal Combustion)
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.

ENGINES (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp.,
Bethlehem, Pa.
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Canada Steamship Lines,
P. O. Box 2430, Montreal, Can.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Ingersoll-Rand Co.,
11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sturtevant, B. F., Co., Inc.,
Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
11 Broadway, New York City.

Cummings

Combination Counter & Telltale



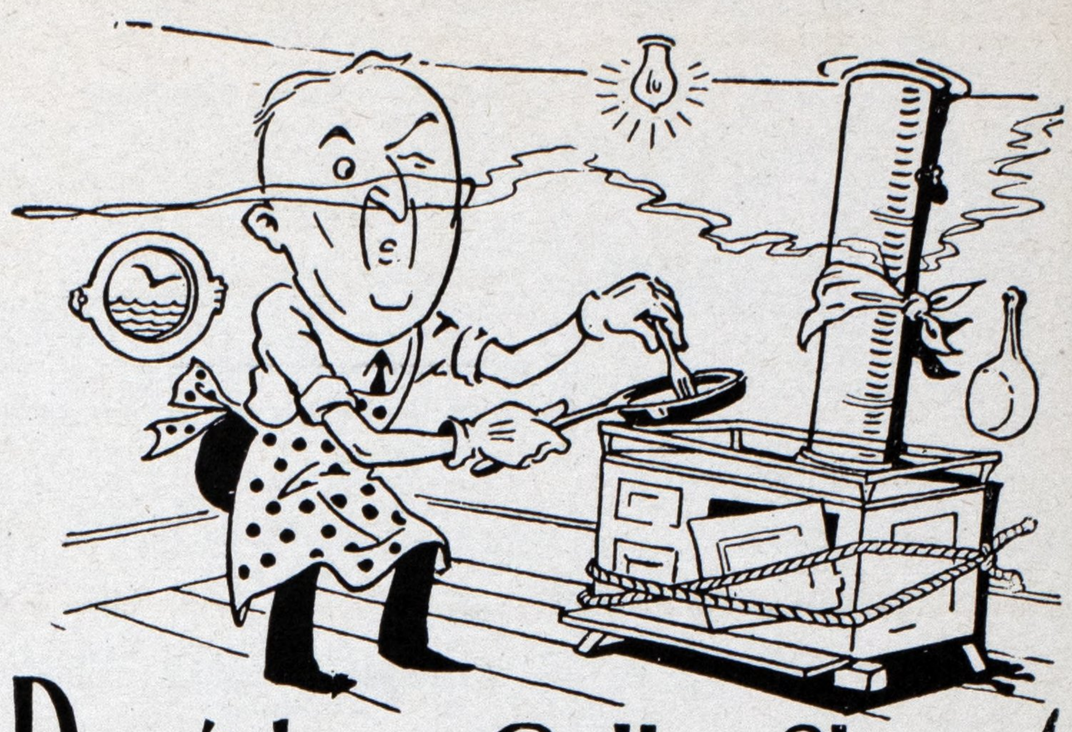
Adopted by the Panama Pacific Line on
S. S. California
S. S. Virginia
S. S. Pennsylvania

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Cummings Machine Works

255 Atlantic Ave., Boston, Mass.



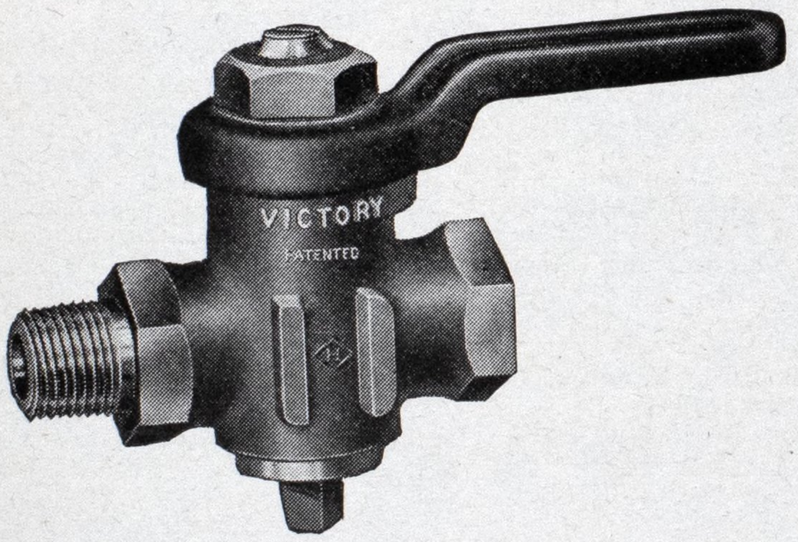
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STAMFORD, CONN.



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Write for particulars

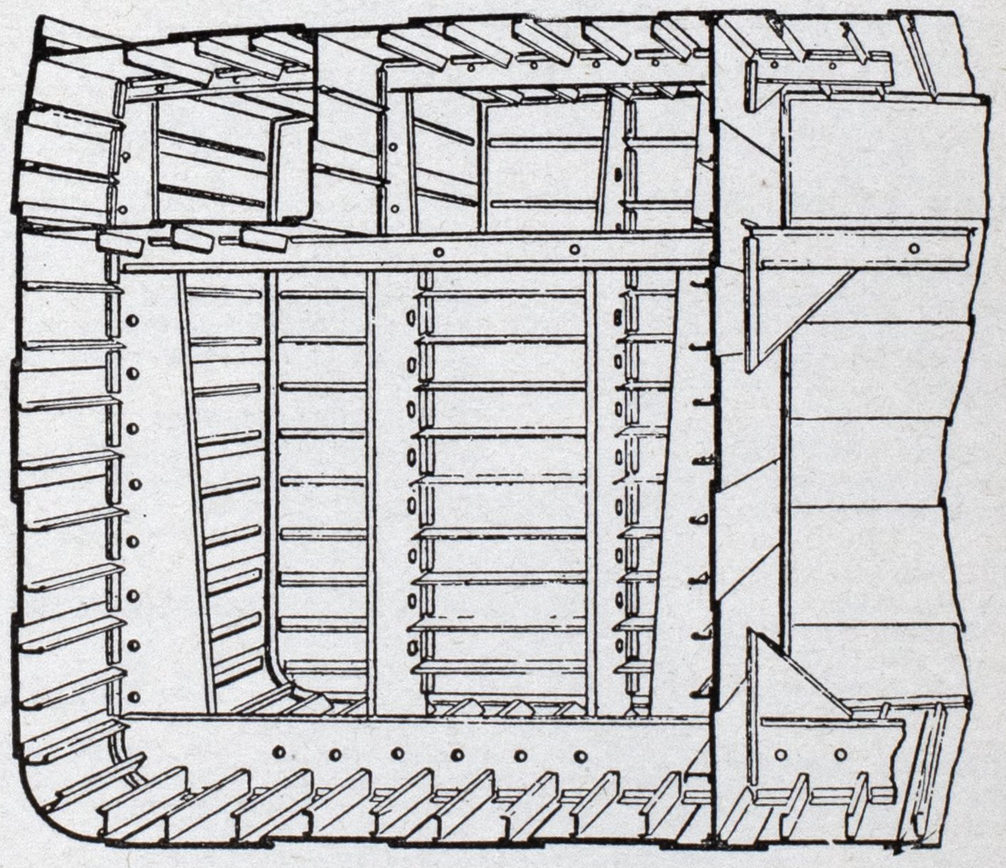
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Haydenville, Mass.

Progress in Oil-Tank Ship Construction

The "Bracketless-System"

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Eliminates Bulkhead Brackets
Eliminates Bulkhead Leakage
Greatly Simplifies Construction
Greatly Reduces Cost of Damage Repairs
Greatly Reduces Cost of Cleaning Tanks
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17 BATTERY PLACE, NEW YORK
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1

ENGINES (Oil)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts., St. Louis, Mo.
Cooper-Bessemer Corp., The, Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.
Ingersoll-Rand Co., 11Broadway, New York City.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

ENGINES (Steam, Steering)
Dake Engine Co., Grand Haven, Mich.

ENGINES (Vertical, Enclosed, Self Oiling)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.

EUROPEAN STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Line 39 Broadway, New York City.

EVAPORATORS
Griscom-Russell Co., 285 Madison Ave., New York City.

FANS (Electric)
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)

FEED WATER REGULATORS
Babcock & Wilcox Co., 85 Liberty St., New York City.

FLANGES (Forged Steel Pipe)
Taylor Forge and Pipe Works, 1440 S. 49th St., Chicago, Ill.

FLOORING
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

FLOOR PLATES
Carnegie Steel Co., Carnegie Bldg., Pittsburgh, Pa.

FORGING BILLETS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

FORGINGS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

FOUNDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
New York Shipbuilding Co., Camden, N. J.

FREIGHT SERVICE
Hamburg-American Line, 39 Broadway, New York City.

FUEL OIL
Texas Co., The, 17 Battery Place, New York City
Vacuum Oil Co., 61 Broadway, New York City.

FURNACES (Corrugated Boiler)
Taylor Forge and Pipe Works, 1440 S. 49th St., Chicago, Ill.

FURNITURE
Marble & Shattuck Chair Co., 10200 Foster Ave., Cleveland, O.

GALLEY RANGES
Stamford Foundry Co., Stamford, Conn.

GAS (Acetylene Dissolved)
Prest-O-Lite Co., Inc., 30 East 42nd St., New York City.

GAS (Nitrogen and Oxygen)
Linde Air Products Co., 30 East 42nd St.. New York City.

GAS (Welding and Cutting)
Prest-O-Lite Co., Inc., 30 East 42nd St., New York City.

GEARS (Marine Equipment)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

GENERATING SETS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.

GENERATING SETS (Direct Connected)
Engberg Division of Troy Engine & Machine Co.. 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

GENERATORS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

GRAPHITE
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co., Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co., Jersey City, N. J.

GREASE
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

GREASE (Launching)
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

HAMMER RAMS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

HARDWARE (Marine)—See MARINE HARDWARE

HATCH FASTENERS
Mullholland Hatch-Fastener Co., Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

HEATERS AND PURIFIERS (Feed Water)
Davis Engineering Co., 90 West St., New York City.
Griscom-Russell Co., 285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

HEATING EQUIPMENT
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

HEATING STOVES
Stamford Foundry Co., Stamford, Conn.

HOISTING ENGINES
Hyde Windlass Co., Bath, Me.

HOISTS (Air)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius. Marine Trust Bldg., Buffalo, N. Y.

IRON (Bar)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Engine Bolt)
Wrought Iron Co. of America, Lebanon, Pa.

IRON (Staybolt)
Wrought Iron Co. of America, Lebanon, Pa.

LAMPS (Mazda and Arc)
General Electric Co., Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp., 3-5 Vernon Ave., Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

LUBRICATING OIL
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

MACHINERY (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Cooper-Bessemer Corp., The, Grove City, Pa.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc. Wis.
Maryland Dry Dock Co., Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINISTS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts., St. Louis, Mo.
New York Shipbuilding Co., Camden, N. J.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

MOTOR GENERATOR SETS
Engberg Division of Troy Engine & Machine Co.. 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Electric)
Engberg Division of Troy Engine & Machine Co., 2229 Vine St., St. Joseph, Mich.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Winch)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S.. & Sons, Brookline, Mass.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co., 112 State St.. Boston. Mass.

NITROGEN (Gas)
Linde Air Products Co., 30 East 42nd St., New York City

OAKUM (Marine, Rope, Packings, Plumbers)
Stratford, George, Oakum Co., 165 Cornelison Ave., Jersey City, N. J.

OIL BURNING EQUIPMENT
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

OIL FOR ALL PURPOSES (Marine)
Texas Co., The, 17 Battery Place, New York City.
Vacuum Oil Co., 61 Broadway, New York City.

OXYGEN (Gas)
Linde Air Products Co., 30 East 42nd St.. New York City.

PASSENGER SERVICE
Hamburg-American Line, 39 Broadway, New York City.

PIPE (Iron and Steel)
Taylor Forge and Pipe Works, 1440 S. 49th St., Chicago, Ill.

PISTON RODS
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

PLATES (Sheared Steel)
Alan Wood Steel Co., Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co., Conshohocken, Pa.

PLATFORMS (Skid)
Truscon Steel Co., Pressed Steel Div., Youngstown, Ohio.

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER WHEELS
American Shipbuilding Co., Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works, River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.
Trout, H. G Co., 220 Ohio St., Buffalo, N. Y.

PROPELLERS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.

PULVERIZED COAL BURNERS
Todd Shipyards Corp., 25 Broadway, New York City.

PUMPS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warren Steam Pump Co., Inc., Warren, Mass.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

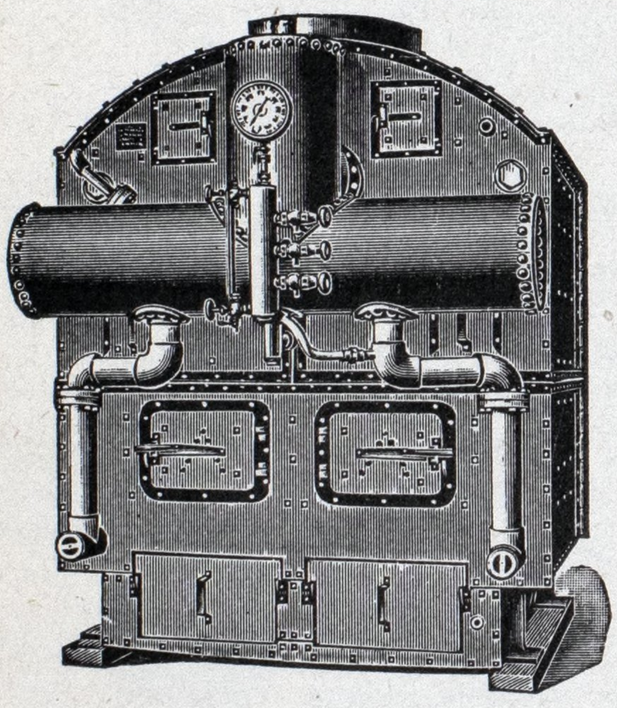
For the New AGWI Liners

BABCOCK & WILCOX Water-Tube Boilers, Superheaters, Oil Burners and No. 80 Fire Brick, for the new steamers of the Atlantic, Gulf & West Indies Steamship Lines, to operate at 300 pounds pressure and 200 degrees superheat, indicate not only the marked advance in recent years towards higher efficiency and economy in the operation of steam-driven vessels, but are the latest and best practice in the field of Naval Architecture and Marine Engineering.

THE BABCOCK & WILCOX CO.

Manufacturers of Marine Water-Tube Boilers Since 1895

SAN FRANCISCO NEW YORK CLEVELAND



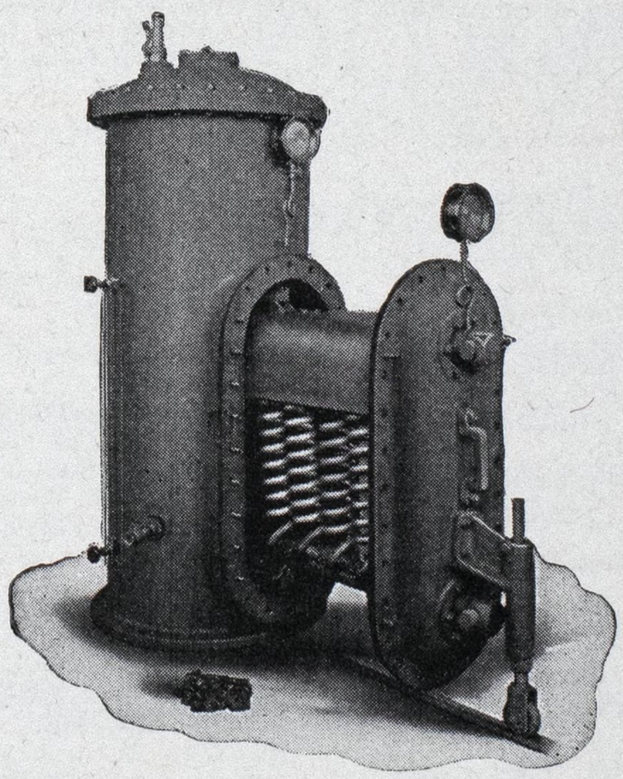
Almy Water Tube Boiler Co.

Builders of Sectional Water Tube Boilers for all types of vessels

Providence, R. I. U. S. A.

CATALOGUE FREE

G-R Evaporators protect 10,000,000 B.hp.



Assure pure boiler feed
Automatically scale-shedding
Increase boiler capacity

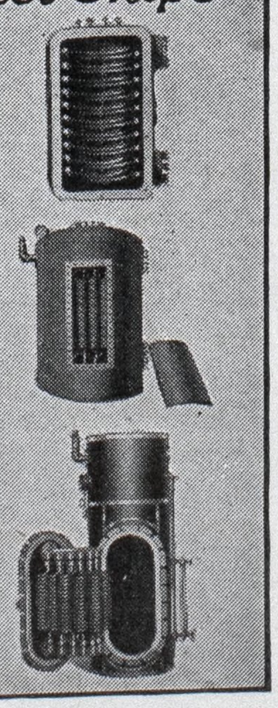
The Griscom-Russell Co.

285 Madison Avenue, New York
Chicago, Monadnock Bldg.

*3

Standard on the World's Greatest Ships

Paracoil
MARINE EQUIPMENT



Operating for years without interruption on many of the largest ships afloat, Paracoil equipment is accepted as standard throughout the marine world.

Paracoil equipment includes the following: Feed Water Heaters, Oil Heaters, Oil Coolers, Feed Water Filters and Grease Extractors, Evaporators, Distillers, Steam Traps, Exhaust Gas, Steam or Hot Water Generators—for Diesel Plants, and Rand System for Heating Bunker Oil.

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DAVIS ENGINEERING CORP.

90 West St. **New York City**

Factory: Elizabeth, N. J.

PUMPS (Ballast)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Warren Steam Pump Co., Inc.,
Warren, Mass.

PUMPS (Bilge)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Warren Steam Pump Co., Inc.,
Warren, Mass.

PUMPS (Boiler Feed)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Warren Steam Pump Co., Inc.,
Warren, Mass.

PUMPS (Direct Acting)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

PUMPS (Power)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

PUMPS (Steam)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Warren Steam Pump Co., Inc.,
Warren, Mass.

PUMPS (Vacuum)
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America,
66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America,
66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St.,
Brooklyn, N. Y.

RANGES
Stamford Foundry Co.,
Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co.,
New Brunswick, N. J.

REPAIRS
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Maryland Dry Dock Co.,
Baltimore. Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

REPAIRS (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Canada Steamship Lines,
P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co.,
So. Chicago, Ill.
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.
Great Lakes Engineering Works,
River Rouge, Mich.
Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc.,
Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

REVOLUTION COUNTERS
Cummings Machine Works,
255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co.,
Manhattan Bridge Plaza,
Brooklyn, N. Y.

RIVETS
Wrought Iron Co. of America,
Lebanon, Pa.

RINGS (Steel)
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

ROLLS (Steel)
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co.,
46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co.,
Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co.,
33rd & Arch Sts., Philadelphia.

RUST PREVENTATIVE (Oil)
Texas Co., The, 17 Battery Place,
New York City.
Vacuum Oil Co., 61 Broadway,
New York City.

SAFETY VALVES (Marine)
Star Brass Mfg. Co.,
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American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Toledo Shipbuilding Co., Toledo, O.

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Sperry Gyroscope Co., The,
Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
General Electric Co.,
Schenectady, N. Y.
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

SELF UNLOADING EQUIPMENT
Smith, Leathem D., Dock Co.,
Sturgeon Bay, Wis.

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85 Liberty St., New York City.

SHEAR BLADES & KNIVES
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

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Conshohocken, Pa.

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Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
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River Rouge, Mich.
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Manitowoc Ship Building Corp.,
Manitowoc, Wis.
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Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
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Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
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STEAMSHIP LINES (Passenger and Freight)
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Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

STEEL BARGES—See BARGES (Steel)

STEEL TANKS
Brunswick-Kroeschell Co.,
New Brunswick, N. J.

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Hyde Windlass Co., Bath, Me.

STEERING GEARS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

STORAGE BATTERIES—See BATTERIES

STOVES
Stamford Foundry Co.,
Stamford, Conn.

SWITCHBOARDS
Engberg Division of Troy Engine & Machine Co., 2229 Vine St.,
St. Joseph, Mich.
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

TELEMOTORS
Hyde Windlass Co., Bath, Me.

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Cummings Machine Works,
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Whitlock Cordage Co.,
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Elwell-Parker Electric Co., The,
4205 St. Clair Ave., Cleveland, O.

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Elwell-Parker Electric Co., The,
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written in FLAKE GRAPHITE *for more than 100 years*

This is the identifying mark of *Dixon's . . . Graphite.* The combination, *Dixon's* and *Graphite,* have been synonymous all over the world for more than 100 years.

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Established 1827

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—All future passengers on the Pennsylvania, as well as the S. S. California and S. S. Virginia, will enjoy the dignity and beauty of *"Chairs Designed for Comfort and Built to Last."*

There are just such chairs for every mariner's purpose.

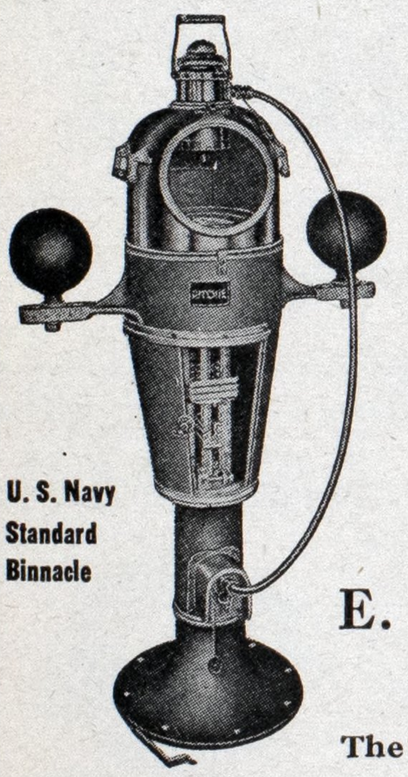
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"Makers of Fine Chairs"

Cleveland, Ohio

New York Office—152 West 42 St.—Tel. Wisconsin 2321



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THE RITCHIE LIQUID COMPASS

The Standard Liquid Compass the world over.

Used Exclusively in U. S. Navy for over 40 years.

Over 65,000 on Merchant Vessels in all parts of the world.

Made in all sizes 2 to 12" dia.

Magnets for adjusting Purposes.

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Agents for the Great Lakes,

The Upson-Walton Company, Cleveland, Ohio

LANE LIFEBOATS

WERE SUPPLIED TO THE

KNOWN THE WORLD OVER — LANE — OLDEST IN THE U.S.A.

BYRD ANTARCTIC EXPEDITION

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BALTIMORE, MD.

Drydocking, Shipbuilding and Ship Repairs of All Kinds

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Floating Machine Shop

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Six words must be added for box address.

To insure insertion, advertisements must reach us by the 10th of the month.

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Please have remittance accompany order.

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FOR SALE: STEAMER GRANDON. LENGTH 64 ft. Beam 16 ft. For further particulars write The Post Fish Co., Sandusky, Ohio.

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SHIP DESIGNER AND CONSTRUCTOR with thirty years experience is open for a position. Prefer Great Lakes location. Address Box 412, MARINE REVIEW, Cleveland, Ohio.

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TUG MANOMET
FOR SALE
750 H.P.—New Boiler
The Central Dredging Co.
Chicago

FOR SALE
STEEL TOW BARGE
"SWEDEROPE"
227 ft. long, 38 ft. beam, 19'6" deep
DETROIT SULPHITE TRANSPORTATION CO.
9125 W. JEFFERSON AVE.,
DETROIT, MICH.

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5000-Ton Bulk Carrier
Steamer Rockefeller
Toledo, Ohio
Recently rebuilt.
The Central Dredging Co.
Chicago, Ill.

For Sale

1-10 KW ELECTRIC LIGHT PLANT WITH extra armature driven by Troy engine. 1-7½ KW Westinghouse turbine driven. 1-1½ KW Moon lighting plant. CALUMET SHIPYARD & DRY DOCK CO., South Chicago.

FOR SALE
COMPLETE COMPRESSOR INSTALLATION
1—9 x 8 ER-1 Compressor with Idler, unloader and lubricator.
1—30 H.P. G. E. Motor 3 phase, 60 cycle, 220 volt A.C., base, pulley and starter.
1—R-6 Receiver, 36" x 8', complete with all fittings.

PERFECT CONDITION.
REDWOOD LINE, INC.
1421 New Orleans Bank Bldg.,
New Orleans, La.

FOR SALE STEAM TUG SUITABLE FOR towing or fishing. 80 ft. long, 16½ ft. beam, 9 ft. draft. Three inch white oak plank, in best condition. 130 lbs. steam, 14½ by 16. Engine fully equipped. Boat in commission now. Box 413, MARINE REVIEW, Cleveland, Ohio.

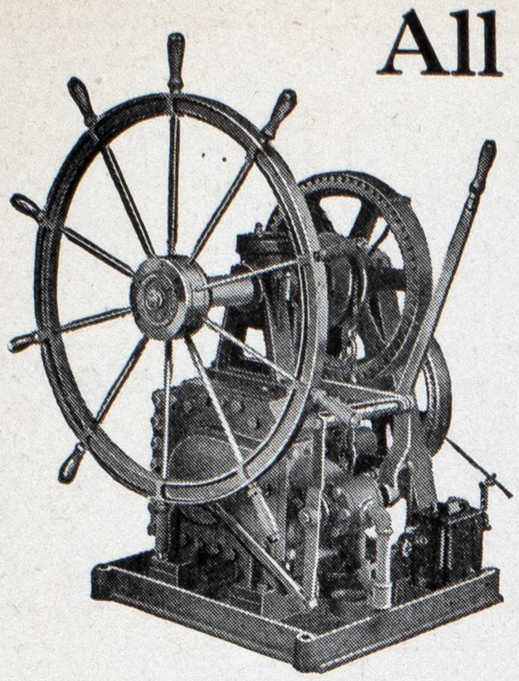
TO OUR SUBSCRIBERS

The classified section of MARINE REVIEW is for your convenience—its value is proving very worthwhile to everyone who uses it to buy and sell.

If you want to buy or sell ships or marine equipment—need a man for your organization—make it known to the entire marine industry through the use of classified advertising in MARINE REVIEW.

Mail copy for your advertisement in the March issue today, so it reaches us before February 20.

All Over the Lakes They're Using Dake's

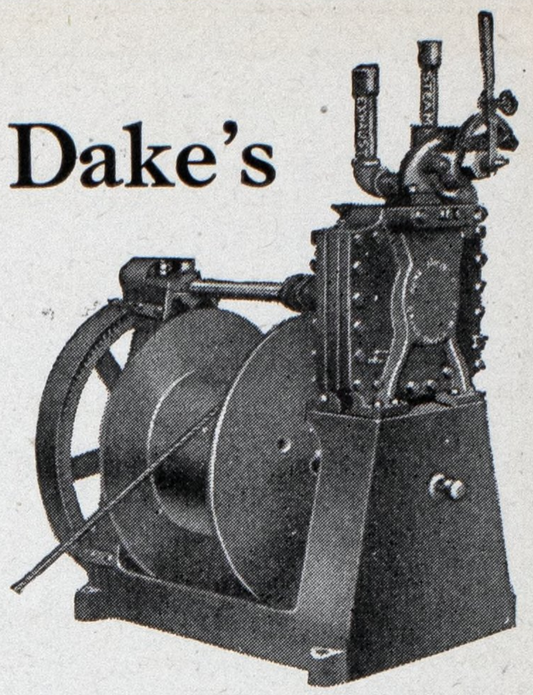


"CS" Steering Gear

Go into any port of consequence on the Great Lakes and you will find vessels using DAKE Steering Gears, Capstans, Windlasses or other auxiliaries. Ask the owners and you will find they give efficient dependable service, with the least expense for upkeep. DAKE Auxiliaries are all simple of construction and very compact. They require less space and very little attention. Write for information on any auxiliaries you are interested in.

Steering Gears, Capstans (hand and steam) Anchor Windlasses, Stage Hoists, Snub Line Winches, Spud Lifters, Net Lifters and Marine Castings.

Dake Engine Co., GRAND HAVEN, MICHIGAN



Snub Line Winch

Kelvin & Wilfrid O. White Co.
112 State Street, Boston
Ship Compasses
Navigational Equipment
Contracts a Specialty
New York and Montreal

Oldman-Magee Boiler Works, Inc.
Boilers, Tanks, Stacks, Structural Work and Castings
Boiler Repairing Promptly Attended to Day or Night
MARINE WORK A SPECIALTY ELECTRIC WELDING
Works: 36-40 Illinois Street - BUFFALO, N. Y.



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221 High Street BOSTON, MASS.
Established 1837
Diving Apparatus and Submarine Armor
Fire Department Supplies
The Morse Monitor Nozzle
Callahan Shut-Off Nozzle

THE MULHOLLAND HATCH-FASTENER COMPANY
Marion Building, Main 0272 Cleveland, Ohio
Manufacturers of the Mulholland Simplex and Security Hatch Fasteners.
For Ocean and Lake Trade
OVER 225,000 SETS NOW IN USE ON THE GREAT LAKES

Leathem D. Smith Dock Co.

Sturgeon Bay, Wisconsin

Self-Unloading Boats our Specialty ***Self Propelled and Self Unloading River Boats***
Wood and Steel Repair Work

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may be safely applied in winter without danger of freezing,—an advantage to lake shipowners.
Write for free samples and quotations.
Selby, Battersby & Co.
Floorcrafters
Wilford Bldg., 33rd and Arch Sts. Phila., Pa.

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Edward P. Farley & Co.
Incorporated
Steamship Owners, Agents and Brokers
11 Broadway—New York



Propeller Wheels and Blades
to fit any hub.
Sheriffs Manufacturing Co.
Established 1854
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VESSEL OWNERS AND BROKERS
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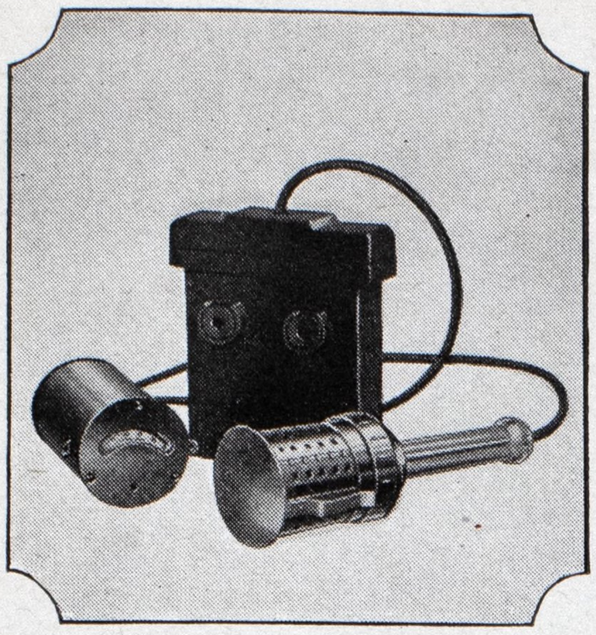
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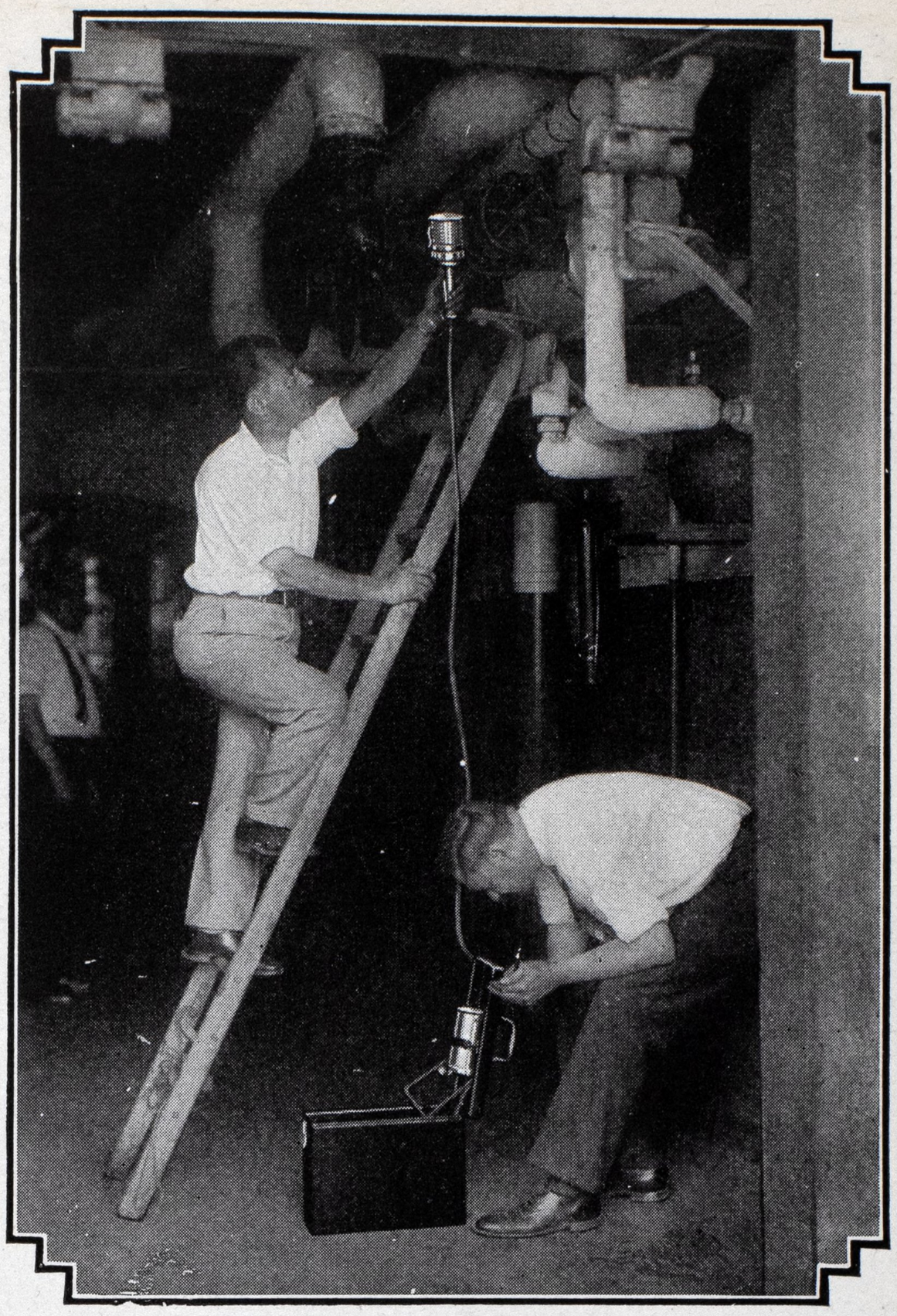
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Instant Readings Help Prevent Accidents

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IMMEDIATE appraisal of the presence of flammable gases. Warning, if they exist in unsafe quantities. The Union Carbide Company—UCC—Combustible Gas Indicator is applicable to a wide range of flammable gases and vapors and determines their percentages accurately. Explosive mixtures are clearly indicated.

Adapted to general industrial requirements from the Methane Indicating Detector developed by Union Carbide and Carbon Research Laboratories and approved by the U. S. Bureau of Mines—the UCC Combustible Gas Indicator fills a need of long standing, where the evolution of combustible gases is an attendant feature of production processes.

Dependable, portable, self-contained and easy to use, this device insures safety and facilitates work.

Descriptive bulletin on request

Distributed by

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Unit of Union Carbide and Carbon Corporation

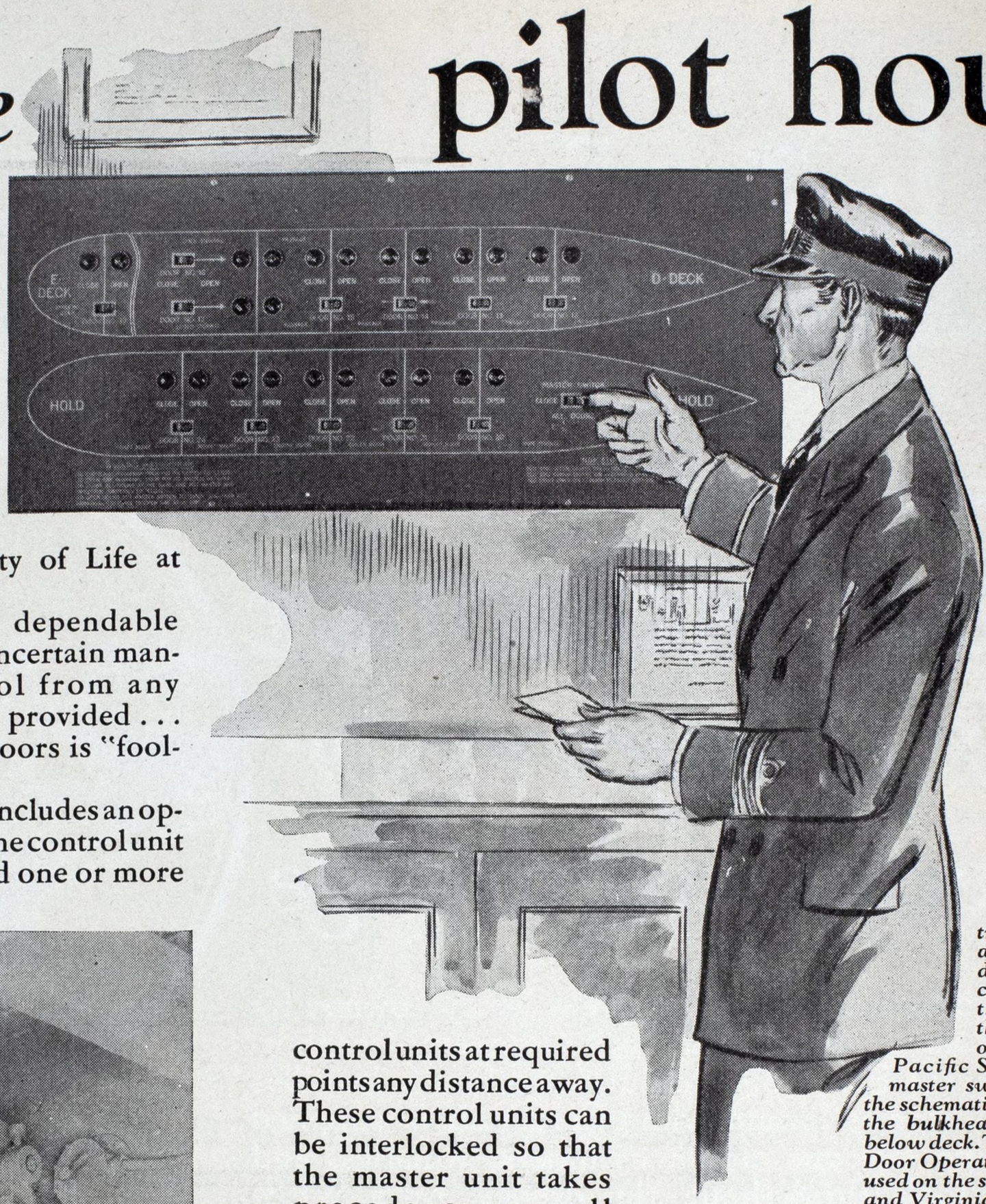
NEW YORK CHICAGO SAN FRANCISCO

and

BULLARD-DAVIS, Inc.

NEW YORK SAN FRANCISCO, CAL.

Close Bulkhead Doors *from the* pilot house

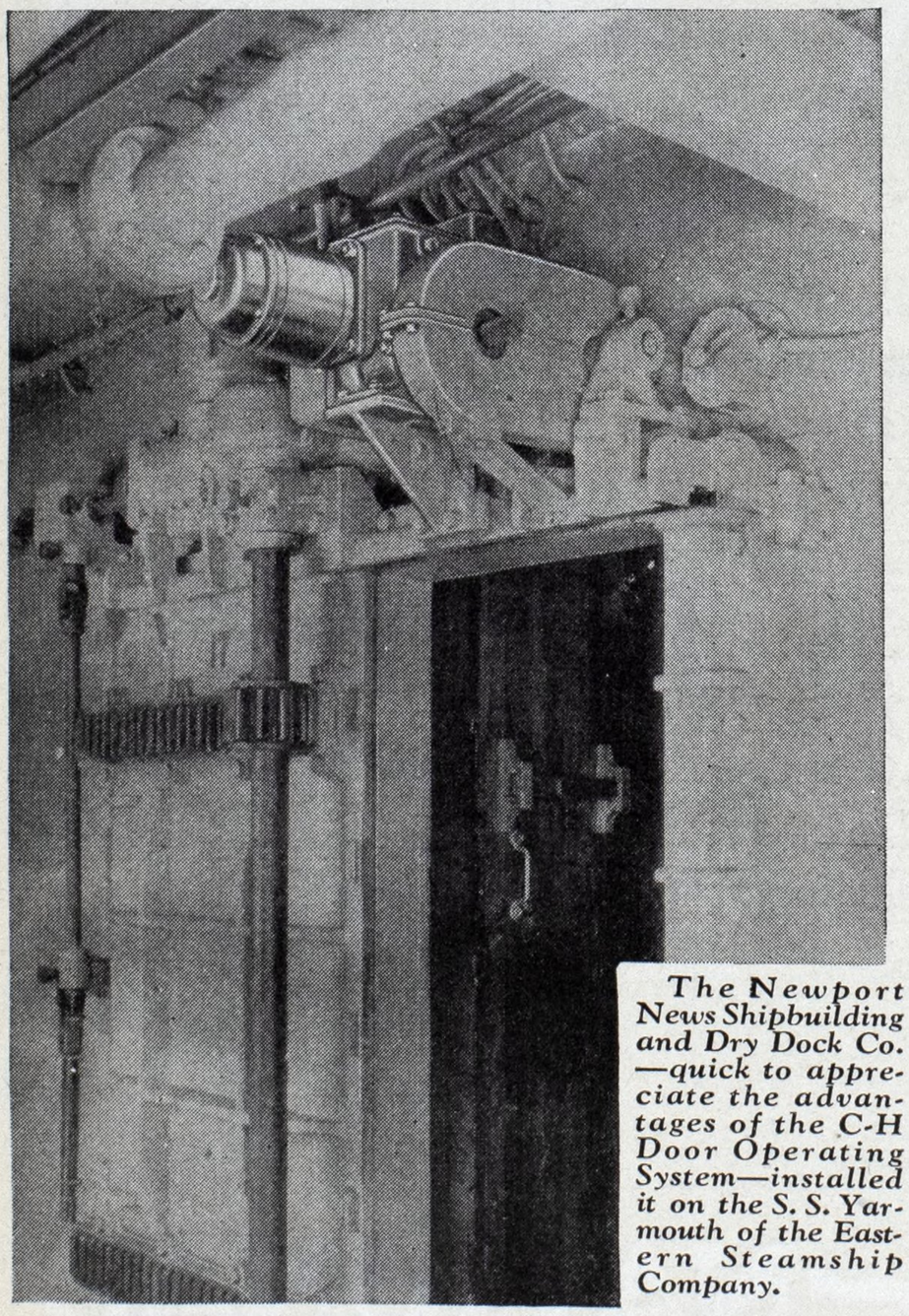


C-H Master Control Panel for operating bulkhead doors in emergencies, as located in the pilot house of the S. S. California of the Panama-Pacific S.S. Co. Note that master switch is located on the schematic plan at the point the bulkhead door is located below deck. The C-H Bulkhead Door Operating System is also used on the ships Pennsylvania and Virginia.

ONE of the chief threats to lives and property at sea has been conquered. Now bulkhead doors can be quickly, positively closed or opened in any crisis . . . with the Cutler-Hammer Door Operating System . . . a system which meets every requirement of the International Conference on Safety of Life at Sea.

With this system, speedy, dependable motor power replaces slow, uncertain manpower . . . positive control from any necessary number of points is provided . . . and the control of bulkhead doors is "foolproofed."

The Cutler-Hammer System includes an operating unit for each door . . . one control unit at each side of the door . . . and one or more control units at required points any distance away. These control units can be interlocked so that the master unit takes precedence over all others. For example, a trapped seaman can open a door to escape, but the door immediately closes again in response to the master unit.



The Newport News Shipbuilding and Dry Dock Co. —quick to appreciate the advantages of the C-H Door Operating System—installed it on the S. S. Yarmouth of the Eastern Steamship Company.

The operating unit located at the door, contains a high-starting-torque motor . . . a motor which has reserve power for any crisis . . . which is moisture-safe . . . and which is so connected that an unseating blow is delivered, assuring positive starting of a little-used door.

The C-H System does not interfere with manual operation of doors . . . is compact and adaptable to any requirement . . . and is backed by over a quarter century of experience on electrical problems aboard ship.

Write for full particulars on this simple way to fulfill all safety requirements—the C-H Motor-Driven Door Operating System.

CUTLER-HAMMER, Inc.
Pioneer Manufacturers of Electric Control Apparatus
1322 St. Paul Avenue
MILWAUKEE, WISCONSIN

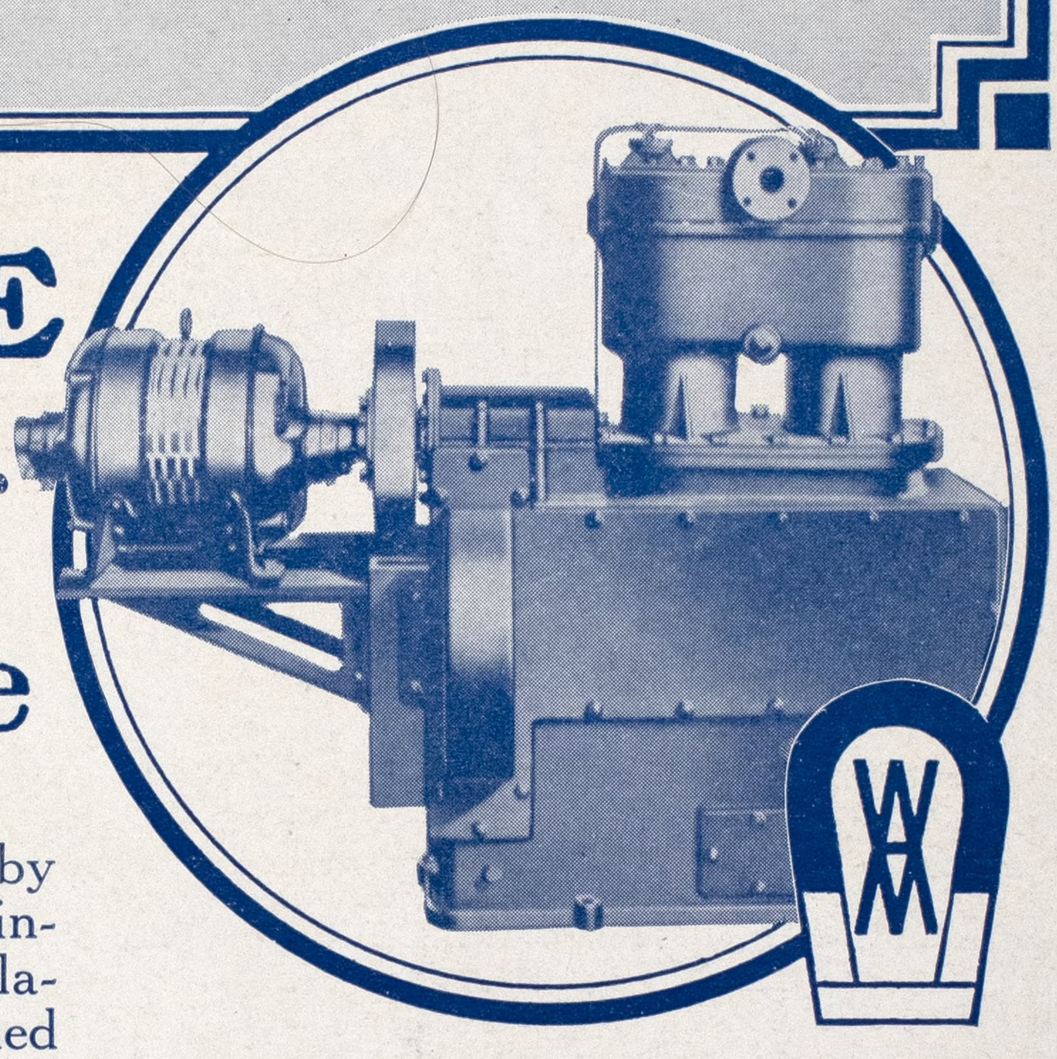
CUTLER HAMMER

Motor-Driven Bulkhead Door Operating Systems

(A-315)



WESTINGHOUSE *Air Compressor* on leviathan dredge



On the huge hydraulic dredge "New Jersey" owned by the Great Lakes Dredge and Dock Company (machinery by Bucyrus-Erie Co.—hull and machinery installation by Manitowoc Shipbuilding Corp.) air is supplied for operating various clutch cylinders, whistles, and pneumatic tools throughout the dredge, by a WESTINGHOUSE-NATIONAL Motor Driven Compressor.

This compressor, the 2VSW Type of 75 cu. ft. displacement, is one of a family of machines that has won a reputation for efficient, dependable, and lasting service. A duplicate of this machine is installed on the Great Lakes Dredge and Dock Co.'s dipper dredge "Crest."

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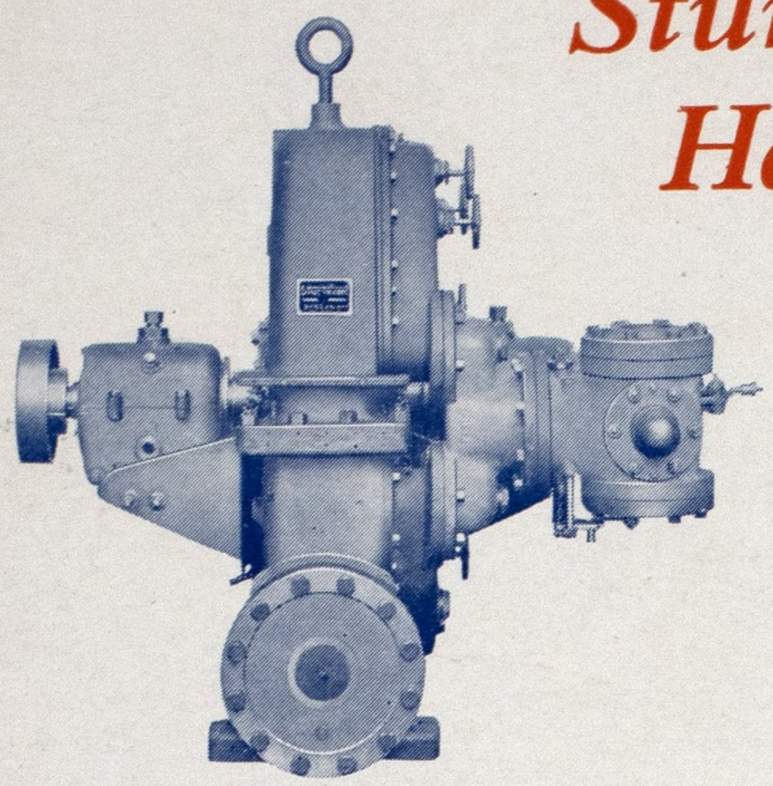
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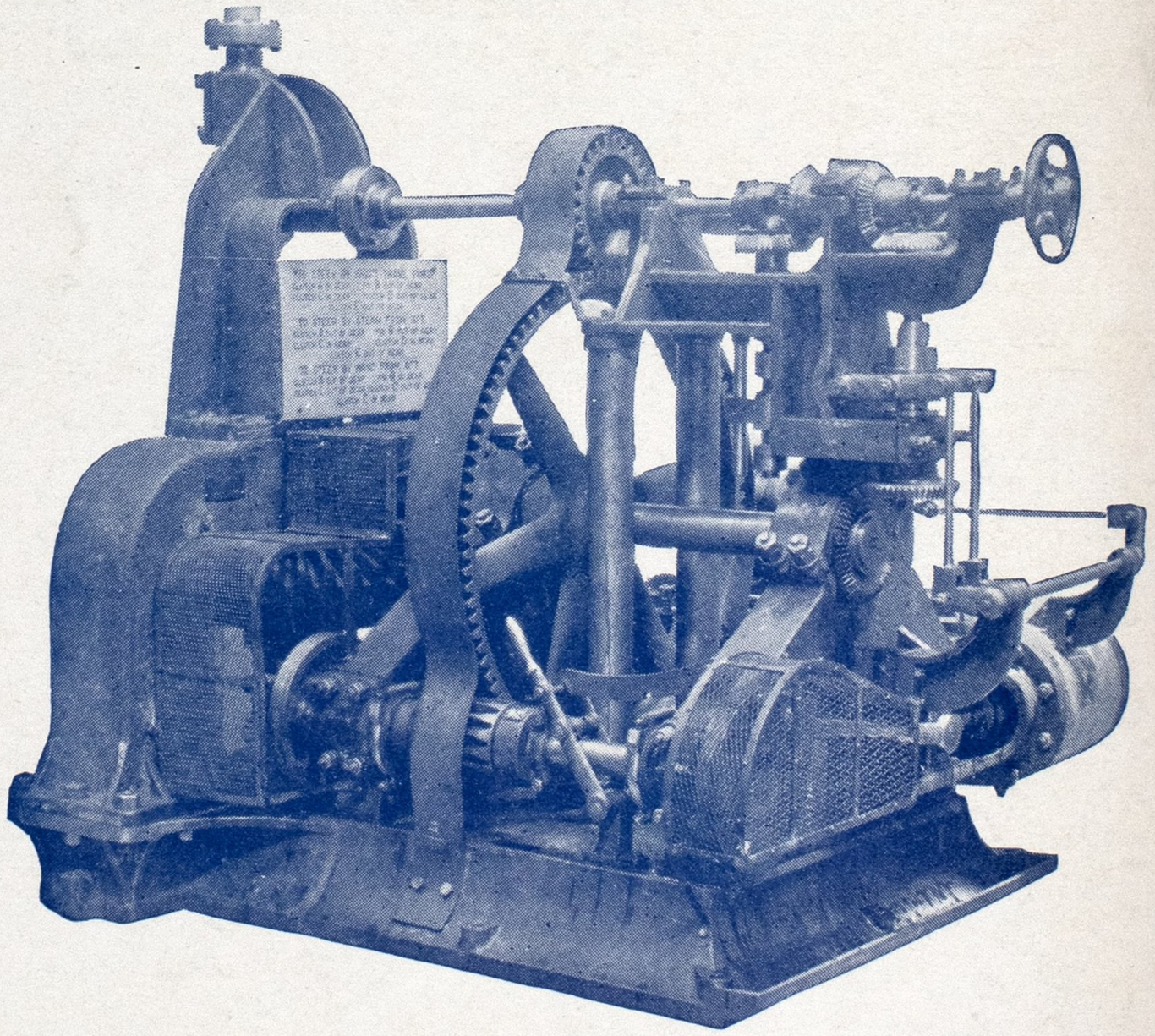
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